DOCUMENT RESUME

ED 361 498 CE 064 433

TITLE	The Educational Software Marketplace and Adult Literacy Niches. Contractor Report, Adult Literacy and New Technologies: Tools for a Lifetime.
INSTITUTION	Education Turnkey Systems, Inc., Falls Church, Va.
SPONS AGENCY	Congress of the U.S., Washington, D.C. Office of Technology Assessment.
PUB DATE	20 Apr 92
NOTE	147p.; For related documents, see CE 064 323 and CE 064 432-438.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Adult Literacy; *Adult Reading Programs; Case Studies; *Computer Software; *Computer Uses in Education; *Economic Climate; Educational Technology; Elementary Secondary Education; Federal Aid; Government Role; Literacy Education; *Marketing; Public Policy
IDENTIFIERS	Market Profiles

ABSTRACT

Over the past 10 years computer technology has come to occupy a central place in American life and has caused a redefinition of the level of literacy skills needed to participate effectively in American society. At the same time, some 20 to 30 million adults have serious problems of basic literacy. Within this context, the Office of Technology Assessment has undertaken a comprehensive assessment of literacy in America and the application of technology to literacy improvement. This report is specifically focused on examining the long-term economic viability of the adult literacy software market, and exploring policy options and their potential impact on the marketplace. The first two of the report's four major sections concern the educational technology market including the structure of the K-12 software market and niche markets in the larger adult literacy market (including job opportunities and basic skills, correctional education, university/college literacy, adult education, and English-as-a-Second-Language/bilingual education), and the economic viability of the literacy marketplace. The third section describes case studies of nine literacy software companies, followed by an analysis of patterns among the case study participants. In the final section, on the economic viability of the literacy marketplace, it is established that, because of the fragmented nature of the literacy market, the current economic recession, and other factors, the health of the industry supplying software and related products to literacy markets is not good. Software publishers committed to the literacy marketplace for the past 3 years are only now beginning to show small profits, and few corporate profits have been invested in the development of new products. The major barriers faced by literacy software publishers and coping strategies are identified, and several federal policy intervention strategies are considered, including increased stable federal funding for literacy service providers, investment in professional development and technology, and increased federal support for research and development. (MN)

ED 361 498

THE EDUCATIONAL SOFTWARE MARKETPLACE AND ADULT LITERACY NICHES

Education Turnkey Systems, Inc. and
Wujcik and Associates

Contractor Report

Adult Literacy and New Technologies:
Tools for a Lifetime

April 20, 1992

This contractor document was prepared for the OTA assessment entitled *Adult Literacy and New Technologies: Tools for a Lifetime*. It is being made available because it contains much useful information beyond that used in the OTA report. However, it is not endorsed by OTA, nor has it been reviewed by the Technology Assessment Board. References to it should cite the contractor, not OTA, as the author.

CE064933

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- ☒ This document has been reproduced as received from the person or organization originating it.
- ☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

Acknowledgements

We wish to acknowledge the valuable assistance of many individuals and groups who were extremely helpful in providing us information, comments, and insights during the development of this report.

We are grateful for the cooperation and candor of the firms participating in the case studies, and also of those whom we considered but, for various reasons, were not included in the study. Going well beyond their parochial interests, the information they provided is a reflection of their commitment to the appropriate and effective use of technology in literacy market niches.

Several associations were particularly helpful in providing us information, including: the Correctional Education Association, the American Jailers Association, The National Association of Bilingual Education, the National Alliance for Business, the Business Council for Effective Literacy, the Adult Literacy and Technology Network, and the League for Innovation in the Community College. A number of Federal agencies assisted us by providing documents, studies, and related information, including: the U. S. Department of Education's National Literacy Clearinghouse, the U. S. Department of Labor/SCANS, and the Federal Bureau of Prisons. Many officials and policy makers provided useful insights throughout the project.

We also recognize the invaluable contributions of Sharon Goodwin and Charles Watson in the preparation of this report.

Charles L. Blaschke
Anne Wujcik
Blair H. Curry

Table of Contents

Introduction 1

I. THE TECHNOLOGY MARKET 2

A. Structure of the Personal Computer Software Industry 2

1. Market Segmentation 2
2. Market Size 3
3. Market Positioning 4
4. Market Crossover Implications 5

B. The Educational Technology Market 6

1. The K-12 Personal Computer Hardware Market 6

a. Installed Base: 1980-1990 6
b. Projected Market Growth, 1990-1996 8

2. The Integrated Learning System Market 9
3. The K-12 Educational Software Market 11

a. K-12 Software Sales: 1983-1990 11
b. Projected Market Growth, 1990-1996 12

4. The Postsecondary Market 13

a. Market Size and Projections 14
b. Software Suppliers 16

5. Training Market 16

a. Market Size 17
b. Training Providers 18

6. Consumer Market 19

a. Consumer Market Installed Base: 1984-1996 19
b. Consumer Software Market 19

C. Structure of the K-12 Educational Software Market 20

1. Historical Perspective 21
2. Educational Software Market Participants 25
a. Educational Software Publishers 25
b. Consumer Software Publishers 26
c. Educational Textbook Publishers 27
d. Supplemental Publishers 28
e. ILS Vendors 29
f. Business/Professional Publishers 29
g. Multimedia Publishers 31

3. Market Patterns/Lessons 31

Table of Contents
(Continued)

I. D. Literacy Market Implications 33

1. Potential Participants 33
2. Market Barriers 34

II. ADULT LITERACY 37

A. The National Literacy Act of 1991 37
B. Niche Markets 38

1. Job Training Partnership Act/ Job Opportunities and Basic Skills 39

a. Use of Technology 41
b. Program Features 42
c. Technology Sales Potential 43

2. Correctional Education 43

a. Education Programs 44
b. Funding 46
c. Current Computer Use 47
d. Design Features 49
e. Projected Market Potential 50

3. University/College Literacy 51

a. Participation 51
b. Funding/Expenditures 54
c. Current Computer Use 55

4. Adult Education 56

a. Participants 56
b. Funding 56

5. ESL/Bilingual Education 58

a. Use of Technology 58
b. Market Potential 58

6. Other Specialized Markets 59

a. Child-Parent Education 60
b. Community-Based Organizations/ Volunteer Literacy Programs 62
c. Employer Programs 65

C. Analysis of Niche Differences 66

1. JTPA/JOBS 66
2. Correctional Education 68
3. College Remediation and Adult Basic Education 69

Table of Contents
(Continued)

III. CASE STUDIES 71

A. Case Study Companies 71
B. Case Study Summaries 72

1. Company A 73

a. Background 73
b. Entry into the Literacy Market 74
c. Future Viability of the Literacy Market 77

2. Company B 78

a. Background 78
b. Entry into the Literacy Market 80
c. Literacy Trends 84

3. Company C 86

a. Background 86
b. Entry into the Literacy Market 88
c. Literacy Trends 92

4. Company D 93

a. Background 94
b. Entry into the Literacy Market 95
c. Literacy Trends 101

5. Company E 102

a. Background 102
b. Entry into the Literacy Market 104
c. Literacy Trends 107

6. Company F 109

a. Background 109
b. The Literacy Market 111

7. Company G 113

a. Background 113
b. The Literacy Market 113

8. Company H 115

9. Company I 116

C. Patterns and Characteristics 117

1. Characteristics and Patterns of Companies Which Have Entered the Literacy Marketplace 117

Table of Contents
(Continued)

III. C. 2. Publishers on the Literacy Market Periphery 119
3. Firms Deciding Not to Enter the Literacy Market 120

IV. ECONOMIC VIABILITY OF THE LITERACY MARKETPLACE 121

A. Current Market Structure 121

1. Fragmentation 122
2. Unique Program Requirements 122
3. Multiple Channels 123
4. Sensitivity of Demand to Funding and Economic Conditions 123

B. Viability of Publishers/Suppliers 124
C. Major Barriers and Coping Behaviors 125

1. Information Sources 125
2. Design and Development 127
3. Marketing and Distribution 128

D. Federal Policy Intervention and Probable Effects 129

1. Increased Stable Federal Funding for Literacy Service Providers 129
2. Investment in Teacher Training and Technology 132
3. Adopt Secretary's Commission on Achieving Necessary Skills (SCANS) as National Literacy Standard 133
4. Increased Federal Support for Research and Development 135

a. Applied Research 136
b. Market-Related Data 137
c. Small Business Innovation Research Literacy Earmarks 137

E. Federal Policies for Government Assumption of Roles 138

Introduction

Over the past ten years, the personal computer has come to play a central role in American life. American businesses have purchased personal computers in large quantities and used them to improve productivity, communication, and worker satisfaction at all levels of business enterprise. At the same time, American schools "have shown an extraordinary eagerness to adapt these technologies to classroom teaching and learning. ... the U. S. has quickly become a world leader in its attempts to integrate computer-based learning in public schools".[1]

The challenges to American business and education, in terms of productivity, competitiveness, and effectiveness grow steadily. The technology itself is causing a redefinition of the levels of literacy skills needed to participate effectively in today's society -- as a learner, a worker, or a member of the community. Yet, some 20 to 30 million adults have serious problems with aspects of literacy, leading to growing concern about ongoing underutilization of human resources.

It is within this context that the Office of Technology Assessment (OTA) has undertaken a comprehensive assessment of literacy in America and the application of technology to literacy improvement. An important element of OTA's overall assessment, this report is specifically focused on examining the long-term economic viability of the adult literacy software market and exploring policy options and their potential impact on the marketplace.

---

1. U. S. Congress, Office of Technology Assessment, Power On! New Tools for Teaching and Learning, (Washington, DC: U. S. Government Printing Office, September, 1988).

I. THE TECHNOLOGY MARKET

This report represents an examination of the long-term viability of the adult literacy software marketplace. In an attempt to place these technology and literacy issues within a broader context, this chapter of the report examines the general market dynamics of the personal computer software industry, with a specific focus on the educational technology marketplace. This very broad perspective establishes a framework within which to examine further the adult literacy market and the use of technology within that market. It also provides some insight as to the patterns and trends that have shaped the development of other segments of the software industry and the complex interplay among those segments.

A. STRUCTURE OF THE PERSONAL COMPUTER SOFTWARE INDUSTRY

Among the important features of the overall software industry are its degree of segmentation, its size, the positioning of firms within it, and the crossover of products across market segments.

1. Market Segmentation

There are two basic ways to conceive of the current personal computer software industry: by market segment or by application. Segmenting the market by application results in a more orderly framework. In this application-driven scheme, products are categorized by function -- word processors, spreadsheets, graphics packages, programming languages, etc. Another way to segment the industry is by market. Using this segmentation scheme, one looks not so much at the application itself as at the buyer. The major market segments in this categorization scheme are consumers, businesses, educational institutions, and specific vertical market segments. To size these segments of the market accurately, data must be gathered from the purchasers themselves. Vendors are not generally able to track their sales with enough precision to assign their software sales to specific market segments. For example, a popular word processing package might well be purchased by a business, a school, a consumer, and any number of vertical market niches. Exhibit 1 illustrates the interplay of application and market segments.

Exhibit 1

Personal Computer Software Industry

Application	Market				
	Consumer	K-12	Higher Ed	Business	Training
Graphical User Interface	X	X	X	X	X
Productivity Application	X	X	X	X	X
Graphics/Presentation Application	X	X	X	X	X
Instructional/Courseware		X	X		X
Edutainment	X	X			
Entertainment	X				
Authoring/Development Tools			X	X	X
Computer Language/Programming Tools		X	X		X

It is possible to assign the sales of certain types of applications to a given market segment. In this approach, it is assumed that most professional level applications (word processors, data bases, graphics packages, etc.) are purchased by the business community. Entertainment software sales are attributed to the consumer segment, as are certain low-level productivity- and creativity-type applications. Products that aim to teach some specific skill or subject matter are assigned to the educational market.

There are obvious problems associated with this segmentation approach, with the education category being one of the most problematic areas. Under this approach, sales of educational products to the consumer market are categorized as educational; but even more importantly, significant amounts of software sold to educational institutions from other market segments are not accounted for, resulting in a false picture of market size. Nevertheless, some segmentation strategy must be used to allow for sizing, comparing, and discussing major software market segments. This modified segmentation scheme is the data gathering and reporting format employed by the software industry itself, under the auspices of the Software Publishers Association.

2. Market Size

In 1990, the Software Publishers Association (SPA) estimated the overall personal computer software industry size at $4.6 billion. Various types of business applications accounted for the vast majority of these sales -- more than 80 percent. Entertainment software accounted for less than eight percent of the overall market, consumer-oriented productivity/creativity applications

for four percent, educational products for four percent, and programming languages and tools for three percent.[2]

While the above represents the best estimate of the SPA, it is skewed toward the business segment of the market, in part, due to the make-up of the association's membership. The percentage attributed to the education segment is significantly understated. The institutional K-12 instructional software market is estimated at roughly $500 million. This represents money the schools spent on all types of software -- stand-alone and network CAI (e.g., drill-and-practice, tutorial, simulations, problem-solving), ILS courseware, tool applications, computer languages, and programming tools -- used in the instructional program.

These software numbers can be compared to estimates of the total size of the personal computer hardware market. International Data Corporation (IDC), a market research firm, estimates that there were a total of 22.3 million personal computers installed in 1985. By 1990, the installed base had grown to 53.9 million and the 1995 installed base is projected to be 75.8 million. The business/professional market accounted for 60 percent of the 1990 active installed base, with 24 percent found in the home/hobby segment, ten percent in education, and six percent in scientific/technical environments. A total of 9.5 million new personal computers were sold during 1990, with projections calling for 1995 sales of 12.5 million units.[3]

3. Market Positioning

Personal computer software vendors position themselves with respect to both application and their perceived primary market. A company like WordPerfect, for example, positions itself as one of the major suppliers of word processing application software. It also identifies the business market as its primary target, which is reflected both in the type of features it deems necessary to include in its products and its pricing strategies. This overall market position, in turn, shapes the company's marketing and sales

---

2. Software Publishers Association, "Estimated North American Microcomputer Software Sales", press release, (Washington, D. C., February 1991).

3. International Data Corporation, U. S. PC Market Review & Forecast, 1990-1995, (Framingham, MA: IDC, August, 1991).

programs, its advertising strategies, its product development process, and its research and development activity.

Other companies, such as Broderbund, position themselves as consumer market companies. These companies may offer products typically associated with the business segment such as word processors or data bases. Their consumer market orientation, however, dictates that these products be easy to use, incorporate sufficient power and sophistication to meet the needs of low- to mid-level individual users, and be moderately priced. They may also offer educational products; but they target these products at parents and children for use at home. This consumer orientation dictates the products' development investment and design features as well as advertising and marketing strategies.

Still other companies target themselves specifically at the institutional education market. They produce and sell applications developed for use in the classroom. As such, these products may include tools for teachers to use in managing the instructional process. They may also be more complex and comprehensive -- aimed at supporting a total segment of the school curriculum. This classroom orientation, in turn, dictates specific marketing, support, pricing, and product development activity.

Software publishers find themselves in a specific application/market segment as the result of a complex interplay of a variety of factors. The history of the company, the interests of the founders, the experience of sales staff, the time of market entry, and the degree of capitalization all combine to determine the specific market position a company adopts and sustains. Market conditions, success or failure of specific products, technological advances, and company personnel all exert a subtle and continuing influence on the path a company follows as it grows and responds to its marketplace.

4. Market Crossover Implications

Within this general industry structure, which focuses companies on specific application/market segments, there is a high degree of fluidity. Crossover sales occur for all these companies, especially for those with the most general purpose types of applications (such as word processors or, more recently, graphical user interface software). However, in general, such sales

are serendipitous. If a particular non-targeted market begins to contribute consistently to sales volume, the vendor may devote some limited resources to exploiting such crossover sales, but such efforts usually concentrate on low-cost marketing activities, since it is difficult to gain access to distribution channels outside one's established market niche.

In general, as a company becomes more established, it can become increasingly difficult for it to move out of its established markets. Expertise, both marketing and product development, becomes market specific. It may prove easier to use established name recognition to expand into a related application area than to move into a new market segment. For example, an established data base vendor can expand into other business-related applications, such as telecommunications or desk-top publishing. This same vendor may find the unique support demands of the education market to be a real barrier to market entry or be unable economically to access appropriate educational or consumer distribution channels.

B. THE EDUCATIONAL TECHNOLOGY MARKET

The following section focuses on the education marketplace. It presents detailed information on the installed base of personal computers in K-12 educational settings and its historical growth, annual shipments, and projections. The related software market is also examined. Data are also presented relative to the postsecondary market, the training market, and the consumer market for educational products.

1. The K-12 Personal Computer Hardware Market

a. Installed Base: 1980-1990

In 1980, the National Center for Educational Statistics reported 30,000 microcomputers in use in the public schools. In the decade since, the number of personal computers in place increased one hundred fold. The most dramatic growth took place in the years 1983 through 1985. Over the ten-year period, the compound annual growth rate (CAGR) has been 57 percent. Exhibit 2 depicts the historical growth of the installed base in the K-12 market.

There were 3.3 million personal computers installed in the K-12 public and private schools of America as of December 1990. Public schools accounted for 2.8 million units and private schools for another 550,000 units.[4]

The number of schools using computers and the number of computers per school have risen dramatically over the past ten years. At the beginning of the 1981-82 school year, estimates indicated that roughly 18 percent of public schools owned microcomputers. By the start of the 1990-91 school year, 97 percent of all public schools had at least one personal computer.[5] In September 1981, there was an average of four microcomputers per computer-using school, a figure which had increased to an average of 32 units per school by September of 1990. Almost one-fourth of computer-owning elementary schools had more than 30 computers installed and 72 percent of senior highs fell into this group.[6]

Exhibit 2

K-12 INSTALLED BASE OF PCs

1979-80	35,000
1980-81	75,000
1981-82	145,000
1982-83	342,000
1983-84	731,000
1984-85	1,200,000
1985-86	1,630,000
1986-87	2,030,000
1987-88	2,400,000
1988-89	2,900,000
1989-90	3,170,000

Source: LINK Resources, 1991

---

4. LINK Resources Corporation, K-12 Market for Technology and Electronic Media: Ninth Annual Survey, (New York, NY: LINK, May 1991).

5. Quality Education Data, Technology in Public Schools, 1991-92", (Denver, CO: QED, January 1992).

6. Op. cit, LINK Resources.

Private schools continue to lag their public school counterparts with respect to computer use. Among private schools, 88 percent owned at least one personal computer as of September 1990. Private schools averaged 28 computers per building, up from an average of six in 1984. Only ten percent of computer-owning private elementary schools had more than 30 computers installed and 52 percent of private senior high schools fall in this group.[7]

b. Projected Market Growth, 1990-1996

A compound annual growth rate (CAGR) of eight percent is projected to bring the schools' installed base to 5.25 million units by the end of 1995. The effective child-to-computer ratio at that time will be 9:1.

Exhibit 3

PROJECTED K-12 INSTALLED BASE OF PCs

1990-91	3,560,000
1991-92	4,057,000
1992-93	4,500,000
1993-94	4,740,000
1994-95	4,935,000
1995-96	5,250,000

Source: LINK Resources, 1991

Over the next five years, school computer purchasing will be driven by two factors: the need to provide improved access and the need to upgrade the equipment base. Schools can be expected to continue to purchase hardware to improve their student-to-computer ratios, which stood at 15:1 in the public schools at the close of 1990. Given an increasing emphasis on the computer as a student tool, ratios of 15:1 are far from adequate. A few school systems have begun to experiment with lap-top computers, which allow students to carry computers with them to classes as well as to check computers out for use at home.

---

7. Ibid.

At the same time the schools are concerned about replacing their inventory of aging equipment. Although schools are classically reluctant to simply dispose of instructional resources such as computers, the number of TRS-80s, Commodores, and Ataris in the installed base have diminished radically. Older Apple II and IBM models are still typically repurposed, either shifted to lower grade levels or pooled for free access student labs, etc. Schools are buying more powerful, versatile computers, enhanced with graphical user interfaces, improved color and resolution, and capable of supporting more powerful and varied peripherals. The current preferred platform is represented by the Apple Macintosh and MS-DOS 286/386 computers.

Schools are increasingly aware that appropriate educational technology use is only one aspect of the much larger issue of educational reform and restructuring. They also are beginning to understand that their educational technology programs must become more computer intensive in order to effect real and lasting change in both the delivery of instruction and student performance. In the interim, schools will increasingly turn to networks and to integrated learning systems (ILSs) as a means of increasing the efficiency and effectiveness of their instructional technology programs. Whether one or both of these implementations proves to be the answer to current concerns remains to be seen. For one thing, by the mid-1990s both of these implementations will have a totally different look and feel. But for the next several years at least, significant amounts of school money and energy will be devoted to exploring these forms of computer use.

2. The Integrated Learning System Market

The integrated learning system is an area pioneered by Computer Curriculum Corporation (CCC), WICAT Systems, TICCIT, and Control Data over 20 years ago. At that time, instruction was typically downloaded from centralized mainframes to students working at dumb terminals. Control Data's PLATO was primarily a college and training market product, but CCC and later TimeShare Corporation, with its minicomputer-based system, achieved a significant presence in the K-12 market. These systems were often used in remedial settings to improve students' basic skills. Typically, they used proprietary hardware and operating systems. With the advent of the personal computer, integrated systems tended to remain the choice of compensatory education programs, while mainstream programs turned to the PC.

Until the mid-1980s, the ILS market was relatively invisible to the ordinary teacher and of minimal concern to textbook and educational software publishers. ILS vendors had been extremely successful in establishing themselves in the compensatory education market, growing by capturing dollars for which many of the other publishers were not positioned to compete. At the same time, the high entry costs kept competition in the ILS market very limited.

In the mid-1980s, however, several new companies came on the scene, with the goal of updating and adapting the ILS concept to take advantage of newly available, more powerful PCs. These companies also worked diligently at developing courseware that was more visually appealing, flexible, and focused on higher-order skills. Spurred by the publicity these new companies managed to garner, attention began to focus on the unique properties an ILS brings to the delivery and management of an individualized learning program. Older ILSs have subsequently been redesigned to run on standard hardware platforms, incorporating color and graphics, and repositioned to emphasize problem-solving and the development of higher-order skills.

While the majority of present K-12 ILS installations are still in compensatory education settings (e.g., Chapter 1), the ILS has begun to move into the mainstream classroom setting. Some vendors have been particularly successful in establishing themselves in the mainstream educational market, although their penetration is still minimal. Overall, approximately ten percent of schools currently use ILSs, with the majority of funding still coming from Federal sources, especially Chapter 1. The installed base of ILSs is approximately 12,000 to 15,000.

The ILS market has emerged from relative obscurity to become one of the fastest growing segments of the educational technology market. In 1987, the market was estimated at $115 million. By 1990, the market had grown to $225 million. Sales for 1996 are estimated at $715 million.[8] Although these numbers represent largely software revenues, they include revenues generated by hardware sales and service contracts.

---

8. Education TURNKEY Systems, Inc., unpublished report, March 1991.

Exhibit 4

ILS SALES

1987	$115 million	1992	$405 million
1988	$140 million	1993	$615 million
1989	$175 million	1994	$650 million
1990	$225 million	1995	$685 million
1991	$300 million	1996	$715 million

Source: Education TURNKEY Systems, 1991

3. The K-12 Educational Software Market

a. K-12 Software Sales: 1983 to 1990

In contrast to dollars committed to hardware acquisition, schools have, historically, under-spent for software. Many school districts originally purchased no software for use on their new PCs, expecting the major uses to revolve around computer programming and with the hope that teachers would make up the difference by developing their own applications, directly tailored to their current needs. It soon became clear that neither expectation was valid and the schools began to include software purchases in their computing budgets. Over the years, schools have proven to be a small but reliable market for software sales.

K-12 schools spent $230 million for software during the 1989-90 school year. This includes software purchased by the schools for use in the instructional program, both networked and stand-alone. It does not include software purchased or licensed as part of an ILS or administrative application.

After a drop in 1988-89, software sales rebounded during 1989-90. School purchasing of networks and other forms of multiple licenses helped to fuel this growth, as schools have become increasingly aware of the need to stay within legal guidelines in their software use. Most multiple-use licensing offers the schools very advantageous pricing. In addition, attention focused on multimedia has directed some dollars to the purchase of

products such as "Mammals" and "Interactive NOVA". The shift within the installed hardware base from Apple II to DOS or Macintosh has also generated additional sales, as schools purchase appropriate software formats to run on new equipment.

Exhibit 5

K-12 SOFTWARE SALES

1982-83	$51,000,000
1983-84	$109,500,000
1984-85	$130,000,000
1985-86	$150,000,000
1986-87	$170,000,000
1987-88	$210,000,000
1988-89	$200,000,000
1989-90	$230,000,000

b. Projected Market Growth, 1990-1996

In many ways, the K-12 software market is more difficult to analyze than is the hardware market. For one thing, the list of potential vendors is very long, since schools purchase from the whole spectrum of available software rather than from a limited list of "educational" publishers. It is also very difficult to get accurate budget information from the schools, since software budgets are frequently lumped into the instructional materials line item and not accounted for separately. Districts, individual buildings, and even teachers purchase software programs. Accounting for these various levels and keeping them separate is very difficult. Finally, more and more software is being bundled with hardware in major centralized purchases. Thus, the true amount spent on software used in the instructional program is further obscured.

Current projections place school's 1995-96 non-ILS software spending at $475 million. If economic conditions are favorable and computers become more central to the educational process, non-ILS instructional software spending could increase more rapidly, with 1995-96 sales of as much as $700 million.

Exhibit 6

PROJECTED K-12 INSTRUCTIONAL SOFTWARE SALES

1990-91	$250,000,000
1991-92	$275,000,000
1992-93	$310,000,000
1993-94	$350,000,000
1994-95	$425,000,000
1995-96	$475,000,000

Source: LINK Resources, 1991

The long-term outlook for the K-12 software market will be affected by a number of factors, most notably by the ways that schools opt to use their computers in the instructional process. For example, intensive productivity tool use would require a more computer-intensive environment than would use for drill-and-practice. Moreover, the impact of software designed for collaborative learning environments ("groupware") and of multimedia presentation systems remains to be determined. Although steady increases are projected overall, the rate of growth also depends to some extent on economic conditions. The software market remains extremely competitive, not only with IBM and other systems-oriented vendors competing with software publishers for the schools' limited software budgets, but with new players also entering the market. While many of these new players are focused on multimedia applications, at least some of the funding for these products will be drawn from existing computer software budgets. In good economic circumstances this could serve to
build total market size, but in weak conditions, it will serve to intensify competition for limited dollars.

4. The Postsecondary Market

Very little consistent market research has been conducted on the postsecondary education market over the past five years. What work has been done has tended to focus on issues related to strategic planning and policy making. Thus, it is difficult to present a quantitative analysis of the extent of the installed base or its growth patterns. It is clear, however, that personal computers have come to constitute a significant portion of the

overall installed base of campus computing equipment, along with the inventory of work stations, minicomputers, and mainframes.

In addition, many personal computers are owned by the faculty and staff of the postsecondary institutions, as well as by a rapidly increasing number of students. This segment of the postsecondary market falls into one of the gray areas with respect to categorization. Some of the equipment in faculty offices has been purchased with institutional money and some with personal funds. The same holds true for the software in use. The equipment in these faculty offices is used largely in productivity modes -- for word processing, calculation, graphics, etc. The amount of money spent on this software is almost impossible to ascertain and, even if known, would be difficult to assign to a given market category. This illustrates, once again, how complex the "educational software" industry can be.

Estimates indicate that roughly one in five postsecondary students own personal computers. Student-owned PCs and software should be categorized as consumer products. They are purchased with personal funds. The software applications owned are typically not specifically educational, but are also productivity-oriented. If a student needs to use a particular courseware product, such as a drill-and-practice chemistry program, he/she would, in almost all cases, use an institutionally-owned copy of that software and probably use it on a general access PC located in a centralized college facility. Nevertheless, if the student purchased the computer and associated software through a campus reseller program or as part of a special hardware vendor promotion, that sale is likely to be considered an educational sale by the vendor(s) involved.

a. Market Size and Projections

Within the above caveats, some basic information on the size of this market is available. IDC estimates that at year end 1990 there were some 5.3 million personal computers installed in educational institutions. Subtracting the number of machines that LINK Resources places in the K-12 market leaves a total of 2.08 million personal computers at the postsecondary level. On the other hand, using data extrapolated from the EDUCOM/University of Southern California National Survey of Desk-Top Computing, the postsecondary installed base stood at 2.6 million in 1990.[9]

Another measure of market size is reported by the Directory of Computing Facilities in Higher Education. Respondents were asked to estimate the number of institutionally-owned personal computers and installed work stations in public clusters for student access. Based on the responses of 984 institutions, it appears there are about 13 to 18 personal computer clusters in universities and three to five clusters in colleges. University clusters average 20 to 25 units, while the college clusters have an average of 15 units. Work station clusters have about half as many units, as do the personal computer clusters.[10]

Computer resale agreements are an important channel for reaching the postsecondary market. Sixty-three percent of responding institutions had resale agreements with computer manufacturers and 40 percent had agreements to resell software to students and faculty through campus bookstores, other on-campus centers, or through designated off-campus software dealers.[11]

Data gathered during the 1991 USC survey indicate that postsecondary institutions are feeling the effects of the financial problems currently affecting most states. Overall, 36 percent of responding campuses reported reductions in academic computing budgets. Twenty percent reported these reductions to be five percent or more. Public institutions are more affected by the budget crisis than private schools and community colleges are most affected. Forty percent of community colleges reported budget cuts for academic computing and 25 percent indicated the cuts will equal or exceed five percent.[12]

---

9. USC Center for Scholarly Technology, "1990 EDUCOM/USC Survey of Desk-Top Computing", (Los Angeles, CA: USC Center for Scholarly Technology, October 1990).

10. Seminars on Academic Computing, Directory of Computing Facilities in Higher Education (Austin, TX: University of Texas, 1990).

11. Ibid.

12. USC Center for Scholarly Technology, "1991 EDUCOM/USC Survey of Desk-Top Computing in Higher Education", (Los Angeles, CA: USC Center for Scholarly Technology, October 1991).

b. Software Suppliers

Postsecondary institutions purchase personal computer software from a wide variety of sources. Unlike the K-12 market, a broad body of curriculum-oriented software for higher education does not exist. There are a limited number of publishers who supply curriculum-related products. These vendors include college-level software publishers, college textbook publishers, and some K-12 educational software publishers. In addition, there is a growing body of faculty-developed curricular software. Distribution for this latter type of product has proven to be a problem, but groups such as Intellimation (a Macintosh-oriented distributor), and various shareware and electronic bulletin board exchanges are getting this faculty-developed software into the distribution channels.

With respect to using computers in instruction, the USC survey indicates that 61 percent of responding campuses nationwide indicated that "using instructional software in classes" will be a very important component of overall campus computing plans and policies in the next two to three years and 68 percent reported that "using instructional software as a supplement to classes" will be very important.[13]

Aside from instructional products, postsecondary institutions purchase software from all segments of the software industry. The productivity and administrative needs of this market are no different from those of the business/professional community. In addition, the colleges constitute a major market for the vendors of scientific/technical products -- programming languages, mathematical modeling packages, statistical analysis tools, CAD/CAM, etc.

5. Training Market

The training industry provides training tailored to the needs of specific employers. According to data from the U. S. Department of Labor, large companies purchase almost 40 percent of the formal training they offer

---

13. USC Center for Scholarly Technology, "1990 EDUCOM/USC Survey of Desk-Top Computing" (Los Angeles, CA: USC Center for Scholarly Technology, October 1990.

from outside vendors; smaller companies purchase an even larger share from outside sources. Higher education institutions, private for-profit companies, professional associations, and a host of individual consultants provide training for managers and technical personnel. Training for skilled workers is available from junior colleges, postsecondary technical schools, and private providers. Vendors and consultants provide most sales training. Industry and trade associations provide a full range of managerial, technical, and sales and marketing training.

Employer-sponsored training is generally delivered in two different ways: formal coursework and informal on-the-job training. In 1989, it was estimated that employers spent about $30 billion for formal training and between $90 billion and $180 billion for informal training.[14] This 1989 expenditure was about one percent of payroll, but expenditures of two percent of payroll were not uncommon. Among training-intensive employers, expenditures reached three and four percent of payroll.[15] On the other hand, based on its seventh annual survey of employee sponsored training, Training magazine estimated the size of the 1988 training market to be $39.6 billion; $27 billion was spent on training staff salaries; $8.9 billion on equipment, materials, and outside services; and $3.6 billion on facilities and overhead.[16] Training appears to be reporting on the formal training market.

a. Market Size

There is little reliable data related on the extent of technology use to deliver training. Trainers were among the first personal computer users in most major corporations, using personal computers to develop and deliver custom-developed employee training. In 1988, Training magazine reported that 61 percent of its respondents (companies with at least 100 employees) used computers in training. Its 1987 figure was 59 percent.[17] In 1989, LINK

---

14. Anthony P. Carnevale and Lelia J. Gainer, "The Learning Enterprise", (Washington, DC: U. S. Department of Labor/The American Society for Training and Development, February 1989), p. 15.

15. Ibid.

16. Chris Lee, "Training Budgets: Neither Boom nor Bust", Training, October 1988, pp. 43-44.

17. Jack Gordon, "Who Is Being Trained To Do What", Training, October 1988, p. 55.

Resources estimated that more than 75 percent of all U. S. organizations with 50 or more employees used computers in some way in their training departments, if only to manage the training function. Sixty percent of these organizations used computers to deliver computer-based training. Twenty percent used interactive video as a means of delivering training.

LINK estimates that, in 1989, all U. S. organizations with 50 or more employees spent a total of $444 million for computer-based training (CBT). By 1994, the market is projected to reach $1.48 billion.

b. Training Providers

Vendors of technology-related training services and products can be grouped into three major categories. First and largest at this time are the computer hardware vendors who sell both hardware and electronic support services to their customers. The bulk of this training and support is directed to technical personnel, focused on equipment operations, programming, management information systems, and data processing functions. There are also a number of large non-hardware vendors in the data processing market.

The second tier of vendors includes companies that sell development tools to training departments and/or CBT courseware. This courseware is typically customized to meet specific needs of the target organization. Finally, there are a large number of companies that develop generic personal computer user training, related to learning to use a particular application or computer system. This tier also includes a limited number of companies that produce generic videodisc-based training. Increasingly, companies are using CBT for basic skills development.

Training departments also purchase application software from the business/professional segment of the software industry. These products are used to support personnel productivity and to manage the recordkeeping functions of the department. The last few years have seen increasing purchases of graphics and presentation packages as well as of desk-top publishing applications and utilities.

6. Consumer Market

a. Consumer Market Installed Base: 1984-1996

Estimates of the size of the consumer market also vary widely. The Bureau of the Census reported that, in October 1989, 15 percent of all U. S. households owned computers, for a total of 13,683,000 households. This figure was up from 8.2 percent who reported ownership in 1984.[18] In contrast, LINK Resources reports that by the end of 1990, 25.9 percent of U. S. households owned at least one personal computer. Adjusting for multiple PC ownership, the active installed base stood at 27.8 million machines, found in some 24 million American households. In 1984, only 11 percent of households owned personal computers and the installed base stood at ten million units. According to LINK, by the end of 1996, PCs are expected to penetrate nearly one-third of U. S. households, with the active installed base reaching 46.5 million units.[19]

Although consumer market growth has been very steady, it must be remembered that there is a discontinuity that occurred in roughly 1985, as the market shifted strongly away from low-end machines toward a combination of increasingly capable, mid-level and high-end machines. In 1983, the average computer system purchased for home use cost $650, rising to $900 in 1985. By 1990, that average price had risen to $1,700.

b. Consumer Software Market

LINK estimates that retail value of software sold to the consumer PC market reached approximately $2.2 billion in 1990. During the 1989-94 time frame, retail sales are expected to increase at a CAGR of almost 12 percent. Much of that growth will be driven by home productivity and home business/household management applications. The two categories, combined, will account for more than 50 percent of consumer PC retail revenues in 1994. Education, which currently accounts for 25 percent of sales, will shrink to 21

---

18. Bureau of the Census, Current Population Reports, Special Studies, Series P-23, No. 171 (Washington, DC: February 1991).

19. LINK Resources, Consumer Education PC Market Forecast, 1989-1994 (New York, NY: April 1991).

percent. Entertainment sales will slip slightly from 25 percent of the total in 1989 to an estimated 24 percent in 1994. With increased emphasis on multimedia during the 1990s, a new genre of education and entertainment software could bring much excitement to the consumer market, sparking the interest of both adults and children.

This new genre, however, will continue a tradition of blurred consumer market categories. It is difficult to categorize clearly the range of educational products within the consumer market. There are, in addition to titles developed and published by educational publishers, a variety of self-help, enrichment and entertainment products that are used to expand users' bases of information and/or skills, but which are not typically reported as educational products.

There are other difficulties in trying to determine comparable school and consumer sales. Among the most popular products in the school market are word processors and other tools that enhance the written products of students. These same products in the consumer market are seen as personal productivity tools and not counted as educational sales. Thus the same product -- "Print Shop" for example -- is seen as an educational sale in one context and not in another.

C. STRUCTURE OF THE K-12 EDUCATIONAL SOFTWARE MARKET

Having presented data on the estimated size of the various segments of the education market, this section will analyze the structure of this market -- its history, participants, and trends.

The K-12 school market and the industry supplying it has undergone a period of rapid growth and evolution. In 1980, the educational software (personal computer) market barely existed. As the personal computer took root in the schools and its use began to expand beyond the domain of computer science, the demand for software began to grow. As noted above, it quickly became clear that the bulk of teachers were not going to design and develop their own educational applications. Teachers who did not program needed and wanted software that would allow them to put computers into the hands of students.

During the early to mid-1980s the school market moved through a period of extremely tight supply -- which allowed for the creation of numerous small companies all geared to meeting the demand -- to a period of market glut. The industry went through shake-out and consolidation in the mid-1980s, emerging as a more stable and mature market. By 1988, supply had largely adjusted to meet demand. The K-12 schools emerged as a small but relatively stable software market. Profit margins remained problematic, however, due in part to high service and support costs.

Although the educational software market of the 1990s seems poised to enter a new phase, the patterns of its growth and evolution over the past ten years may help define basic elements necessary to success in the marketplace.

1. Historical Perspective

The industry began with the supply of quality software extremely limited. Low entry costs allowed many small companies to emerge, focused on meeting the demand for software. Many of these companies were founded by teachers who themselves had been among the earliest computer users and who had developed the skills to write their own software. They were rapidly joined by a number of companies whose principals were "hackers" -- people fascinated with the technology but with no educational experience or training. The market rapidly filled with a product that was of low technical quality and frequently of dubious educational value. Lack of sophistication and expertise on the part of the bulk of users allowed this product to survive and even, briefly, to flourish.

As the installed base grew, established educational publishers and suppliers began to examine the market, either to protect themselves from potential competitive threat or with the expectation of making substantial profit in a fledgling industry. Schools began to develop some expertise and evaluation procedures began to evolve. Entry costs rose, preventing too many more "mom and pop" start-ups. At the same time, the hardware manufacturers were helping to bring about the emergence of a viable software publishing industry, recognizing that such was central to the continued growth of the hardware market.

In early 1982, a TALMIS survey asked schools to list the software packages they owned. An analysis of the data resulted in a list of publishers with the greatest market penetration. As similar data were gathered over the years, from both the demand and supply side perspectives, it became possible to develop an evolving list of leading software suppliers (see Exhibit 7). An analysis of the individual lists and their change over time describes how the educational software industry has changed over the years.

Exhibit 7

LEADING SOFTWARE PUBLISHERS

1982	1985	1989
Apple	Apple	Claris
Atari		
		Britannica Learning Corp
	Broderbund	Broderbund
Commodore		
	CBS Software	
	Davidson & Assoc.	Davidson & Assoc.
DLM	DLM	DLM
Educational Activities	Educational Activities	Educational Activities
Edu-Ware		
	Hartley Courseware	Hartley Courseware
Houghton Mifflin	Houghton Mifflin	
	IBM Corporation	IBM Corporation
	Lotus	Lotus
MECC	MECC	MECC
Microsoft	Microsoft	Microsoft
Milliken	Milliken	
	Mindscape	
Random House	Random House	Random House Media
Radio Shack	Radio Shack	Radio Shack/Tandy
	Scholastic	Scholastic
Scott, Foresman		
		Simon & Schuster
		Skills Bank
Software Publishing		
South-Western	South-Western	South-Western
	Spinnaker	
	Springboard	
SRA		
	Sunburst	Sunburst
		Teacher Support
	The Learning Company	The Learning Company
Tom Snyder	Tom Snyder	Tom Snyder
Texas Instruments		
VisiCorp		
	Weekly Reader	Weekly Reader
	Word Perfect	Word Perfect

One of the most striking changes from 1981 to 1989 is the diminishing role of the hardware vendors in the software market. The hardware companies' original commitment to the educational software market was largely in the hope of creating an even greater demand for hardware. As the market became established and the supply of software grew to meet demand (thereby helping to spur increased hardware purchasing), most hardware manufacturers got out of the educational software business. Apple spun off its software business to Claris. Tandy/Radio Shack markets only a few proprietary tool products for its MS-DOS machines, although it continues to sell software for the older TRS-80 line of computers. Tandy also sells software from third-party publishers, either through its Express Order program or bundled with Tandy hardware.

Interestingly, as Apple and Tandy/Radio Shack withdrew from the publishing of educational software, IBM entered the education market as both a hardware vendor and a developer/publisher of educational software, making a concerted effort, during the mid-1980s, to develop educational courseware for networked configurations. During that same time frame, IBM also began to encourage third parties to develop courseware for its networks. In 1986, it convened a publishers conference, inviting the CEOs of approximately 60 major software and textbook publishing companies who expressed interests in developing software for MS-DOS platforms. Today, IBM continues to be one of the largest publishers of educational software and is considered a competitor by a number of software publishers, particularly those who are not business partners.

Another notable shift between 1981 and 1989 involved the departure of most of the traditional textbook publishers from the market. The small return on investment relative to their print product lines, lack of expertise in software development, and the resistance/failure of the print sales force with respect to software sales led most textbook publishers to abandon any meaningful participation in the market. Those companies that offered software titles used them as an incentive to increase textbook purchases. Software was not integral to the basal textbook program. Supplemental school publishers such as Milliken and DLM found more success in the software market.

By 1984-85, there was a glut of low-end product in the marketplace, much of it rather poor quality drill-and-practice that had been pushed out the door

to meet demand in the 1981-83 period. The explosive growth of the home computer market had attracted venture capital money and brought to the scene a number of companies positioned to play in the retail environment, but offering a product that mixed game elements with educational content. This product crossed over into the school market in the 1982-84 period. The home computer software companies drove up the cost of product development with their emphasis on color, design, animation, etc. The schools' expectations with respect to technical quality rose, along with those of the rest of the market. While some consumer products were of high educational quality, the schools came to question the value of "edutainment" products.

The year 1985 represents the mid-point and something of a watershed in the first decade of educational software publishing. By 1985, a major shake-out was underway, with many companies disappearing from the market and extensive supplier consolidation taking place. Apple, MECC, Milliken, and Radio Shack had been joined by a host of new companies, including home education publishers such as Spinnaker, Springboard, and The Learning Company. Supplemental school publishers such as Scholastic, Sunburst, and Weekly Reader had made their entry into the software market and had begun to achieve early levels of success. By 1985, Hartley was showing the strength that has propelled it into the ranks of the major industry players, positioning it for its subsequent acquisition by Jostens. Davidson & Associates had been added to the list, joining the select ranks of successful teacher-founded companies. Textbook publishers had largely dropped out of the competition and several of the new business publishers were beginning to penetrate the school market.

The 1989 list reflects the results of the ongoing market consolidation that began in 1985, with the demise of most of the home educational publishers, except Broderbund, The Learning Company, and Weekly Reader. New entrants to the educational market found that niche publishing was one of the few paths to success that remained open for latecomers to the market.

The 1986 through 1990 period saw a more stable and mature market emerge. Schools began to expect quality in terms of content and instructional design, as well as technical quality. At the same time it had become clear that the schools were going to present a relatively small market in terms of dollars and expect a high degree of service and support. Thus product supply has been

constrained through the late 1980s, as companies found they had limited dollars to invest in research and development.

2. Educational Software Market Participants

As noted earlier, schools purchase a wide variety of products for use in the instructional program, ranging from traditional CAI through pure entertainment product. Among the major categories of products school purchase are:

- traditional CAI software/courseware;
- edutainment;
- simulations;
- content-based explorations;
- curriculum-based productivity tools;
- commercial tool products;
- computer languages/programming tools;
- instructional management software; and
- administrative software.

These products come from a wide variety of sources. Although the schools may look to their traditional suppliers (textbook publishers, supplemental publishers, educational software publishers) for products that are content-oriented and used in support of the curriculum, they also purchase products from vendors in all the other software industry segments. Two of the most heavily used software sources outside the established educational segment are consumer publishers and business application vendors. Below are descriptions of the various sources from which education institutions purchase software for use in their instructional programs.

a. Educational Software Publishers

The top level of today's stand-alone K-12 software market is dominated by companies whose only business is software. Founded in the late 1970s and early 1980s, these companies concentrate on developing educational software for either the school or home markets or both. The majority of these companies have strong educational backgrounds, having been founded by former teachers and using teachers as developers, evaluators, trainers, and sales/marketing staff.

These companies, with their focus on software, have certain advantages. Although they are, for the most part, moderate-sized companies ($15 to $50 million in sales), software is the sole source of their revenues and not a minor sideline in a larger print and/or media publishing operation. Since software is central, these companies tend to stay on the leading edge of the technology curve, recognizing the competitive advantage that can accrue from being first to market on a new hardware platform or the first to exploit an emerging technology niche, such as CD-ROM.

However, these companies are not as well positioned as those publishers with textbook or supplemental publishing experience to compete in the rapidly evolving school market that focuses on more comprehensive and systematic instruction. Despite their technical expertise, many of the companies focusing on the school software market, with its more limited sales potential, are too small to invest in costly product development projects. While home education publishers in this segment can invest more in product development given the greater return on investment that the home market offers, they do not have the resources or experience to develop wide ranging curricular products. The educational software publishers are well positioned, however, to become partners with hardware vendors, ILS vendors, consumer electronics vendors, and traditional textbook publishers to engage in large-scale product development activities.

b. Consumer Software Publishers

Unlike the home education publishers in the above segment, these companies do not specialize in educational product. Their products cover the gamut of consumer market applications -- entertainment, home management, creativity, and personal productivity. Among their product lines are some applications that, although not inherently educational, can be used effectively in the school setting. This usually occurs with a general purpose product, such as a word processor or some other tool or utility product, though it could also be a game. Without any real effort on the parts of the vendors, these products sell to the institutional education market.

The bulk of these companies are content to accept these serendipitous sales, without effecting any change in their marketing, support or development activities. In some limited instances, the sales are so significant and

engender such a degree of school interest that the company makes a formal decision to enter the school market, typically by establishing a separate Education Division. The most notable example of this is Broderbund.

c. Educational Textbook Publishers

The textbook has come to be the major delivery mechanism for information/content in the K-12 schools, resulting in a multi-billion dollar K-12 textbook market. Textbook sales have increased steadily over the past ten years. In 1983, an average of $25 per pupil was spent on textbooks. That had increased to an average of over $42 by 1990. Domestic textbook sales totaled $1.9 billion in 1990.[20]

The traditional textbook publishers reacted with considerable concern to the advent of the educational software industry, recognizing in the technology a potential threat to their traditional market dominance. As a result, in largely defensive moves, most of the major publishers flirted with software publishing in the early to mid-1980s, while a few companies made major investments in the software business, setting up Electronic Publishing Divisions and engaging in major product development activity.

While levels of success varied, ultimately no traditional textbook publisher found the educational software market profitable enough to commit major resources to it. Most textbook publishers eventually evolved a pattern of offering a few software titles, largely in support of their textbook product line (Scott, Foresman and Company, Harcourt Brace Jovanovich, etc.). Several companies have maintained small but active software divisions (Silver Burdett & Ginn, Macmillan), but they do not find themselves on the lists of most popular suppliers or most profitable software companies.

Beginning with passage of a 1990 law in Texas, an increasing number of states are now establishing policies that allow school districts to use traditional textbook adoption funds for the purchase of electronic media. California, Florida, Oklahoma, Texas, and Utah have already passed legislation or otherwise established formal policies allowing such purchases, and

---

20. Association of American Publishers, personal communication of data from School Division.

knowledgeable individuals project that, by 1992, more than half of the current textbook adoption states will have developed either formal or informal policies which will allow such use of textbook funds.

This chain of events, coupled with growing school interest in multimedia products, has now aroused real fear among the textbook publishers. The publishers are aware that multimedia content promises an array of learning experiences far richer than those provided by print alone. For the first time in nearly ten years, textbook publishers see an electronic product mounting a challenge to their markets. Having learned from their forays into software publishing that their expertise does not extend readily to electronic media development, textbook companies are likely to seek to form significant partnerships with software publishers, ILS, and hardware vendors, resulting in joint ventures, acquisitions, and co-marketing arrangements which position them for participation in the emerging multimedia market. The trend has already begun. In 1990, Simon & Schuster purchased CCC and, in 1991, McGraw Hill purchased CSR.

d. Supplemental Publishers

The supplemental publishers are very much like their educational software publisher counterparts, except that software is not their sole focus. They may be a software division within a larger print operation (e.g., Scholastic) or a company that includes products other than software within its product mix (e.g., Sunburst, SVE). These companies concentrate on the institutional education market. Several of the supplemental publishers are among the most successful of the K-12 software vendors.

It is sometimes difficult for a supplemental publisher to get the attention needed from the larger organization of which it is a part. Though its software sales may be significant with respect to the overall K-12 software market, they are likely to be relatively small with respect to the overall sales of its parent organization. Even for those companies in which software is the primary product line, the presence of other products can dilute focus. Of course, depending on the nature of the other products, the supplemental publisher can also benefit from synergies and potential co-marketing and joint product development activities within its own organization. This will prove to be a growing advantage as multimedia comes

to be the market standard. The fact that they are part of a broader organization also helps to make these companies more attractive partners.

e. ILS Vendors

As noted above, these vendors constitute one of the fastest growing segments of the K-12 technology market. They are involved in developing large-scale, networked instructional systems which are sold to the school as part of a total bundle -- hardware, instructional software, and management and recordkeeping software. The instructional software associated with these systems covers multiple objectives and grade levels.

The ILS vendors possess considerable technical expertise, particularly as it relates to the delivery of networked and managed instruction. Although once largely text-based systems, since the mid-1980s market dynamics have forced the companies in this segment to incorporate color, sound, and graphics into their programs. The majority of ILS vendors have already forged limited alliances with a variety of third-party software publishers in order to add value to their systems and to meet school requests for access to popular stand-alone products within the ILS. They have been among the first to experiment with optical media, recognizing the synergies that exist between their products and the emerging multimedia market.

ILS companies are well-positioned to compete at the high end of the school market, with its concern about accountability and systematic instruction. Their experience with large scale development projects should allow them to move easily into managing the development of large-scale multimedia products. They are most likely to seek partnerships with hardware vendors, telecommunications companies, and data base/content owners (such as textbook publishers) whose information bases can add depth to their product offerings.

f. Business/Professional Publishers

In the early days of school computer use, when a significant number of computers were in high school business classes or used to teach computer programming, a number of business publishers and systems houses sold product to the school market. Among the more successful were MicroPro, Microsoft,

Software Publishing, and VisiCorp. When IBM entered the market, it sold its line of programming and business titles to the schools before developing curriculum-oriented titles. Today, with the interest in tool use, schools are purchasing increasing numbers of products from sources other than the established educational publishers.

Publishers whose product lines include traditional tools such as word processors, data bases, filing programs, spreadsheets, printing utilities, desk-top publishing programs, presentation tools, and graphics programs have the potential of selling that product to the K-12 market. There is nothing inherently educational about these programs, though they certainly can be used well in school settings. In practice, such programs are among the more popular software titles purchased by schools because they so easily lend themselves to curricular integration and make it possible for the schools to use computers across curricular areas.

Some educational publishers, such as Scholastic and to a lesser extent Sunburst, have developed a line of tool products specifically designed for the school market. However, high schools and, increasingly, junior high schools tend to want to use the tool that is in use in the "real world". Thus, in the early days of educational computing, WordStar was one of the more popular high school titles, as was VisiCalc. Today, products such as WordPerfect, Lotus 1-2-3, Microsoft Word, Microsoft Works, Apple Works, PageMaker, HyperCard, Print Shop, Paintworks, and Harvard Graphics can be found in the schools, used by both teachers and students to support learning activities.

Compared to the size of the business market, school sales for any one of the business publishers associated with the above titles are quite small. Schools continue to supply a steady stream of revenue to these business publishers as well as administrative application and test product publishers. Further, there is some advantage to having students familiar with your product in terms of future loyalty. Companies such as Microsoft and WordPerfect have established small educational sales operations, usually encompassing both K-12 and college. Although these are typically low profile, direct mail operations, more and more major business publishers have become a presence at the major educational trade shows. Several publishers have developed specific school packages which offer limited versions of the software, with teaching support, at a greatly reduced price.

g. Multimedia Publishers

Participants in this emerging market segment are drawn from most of the above categories. In addition, there are several publishers in this market segment who are new to both software publishing and the school market. Their motivations for entrance into this segment are myriad. Some companies, such as Microsoft and Tandy, are ultimately interested in increasing the installed base of multimedia-capable hardware. Others, such as ABC and National Geographic, are exploiting the visual data bases they own or have licensed, experimenting with product design features and exploring the potential of the multimedia market. Still others, notably IBM, believe that multimedia holds the potential to transform American education and are interested in shaping the future of the market, as well as hoping to exploit the potential of being among the early entrants.

The movement to multimedia is one of the emerging trends of the school market. It also has consumer market potential. Multimedia is linked to the convergence of computer and video technologies. Educators increasingly recognize the educational potential of multimedia. At present, multimedia is a moving target. Current implementations tend to use videodisc to deliver full-motion video. However, digital solutions are under development and several consumer products, based on adaptations of CD-audio technology are already being sold. These include Commodore's CD-TV and Philips' CD-I. In these consumer technologies, the computer is relatively hidden and the device hooks up to a standard television set. As prices drop from the existing $1,000 level and the technology improves, some of these devices may find their way into the school market. In addition, both Apple and IBM have developed and will continue to evolve video compression schemes that put the personal computer more directly at the heart of future multimedia systems.

3. Market Patterns/Lessons

While many companies have come and gone in the educational software industry, others have emerged as constants. What marks a successful player from those who have fallen by the wayside? Although the product lines offered by the leading companies vary widely, the successful companies have a number of common characteristics.

Successful publishers are not identified with any specific machine format. As the hardware market grew, these companies were able to keep abreast of the changes (sometimes even ahead of them), giving themselves the lead of a few precious months in a very competitive market. Although not aligned with a particular hardware manufacturer, many of the most successful companies have maintained good relations with the hardware manufacturers in order to maintain their technical edge. As the industry continues to evolve technically, joint ventures between publishers and hardware manufacturers will become an increasingly important factor in the market. The emerging multimedia market is too costly, from the development point of view, for the majority of established educational software publishers to tackle on their own.

The top software companies employ a variety of distribution channels, with those who still have a presence in the consumer market enjoying the best access to retail distribution as a result of having been among the earliest entrants to the field. School publishers rely heavily on direct marketing methods (including proprietary catalogues), as well as presence in third-party software catalogs. As the software market has become more sophisticated in response to the demand for network software, telecommunications, and now multimedia, successful software publishers have continually sought new distribution channels, turning to joint marketing ventures with peripheral and LAN vendors to extend their market reach and to assist them with the complex support problems associated with advanced technologies.

Most successful publishers have invested heavily in achieving recognition as major suppliers of educational software. They advertise in education magazines, attend shows and exhibits, and use direct mail techniques to reach customers. In addition, many of the top companies have been very active in supporting teacher training efforts, sponsoring a variety of workshops and institutes, which have allowed them to gain further attention for their products within the education community.

The successful publishers have learned to optimize their product development investments by modifying and repurposing existing products so that they have market crossover potential. Consumer edutainment products are often packaged with educational support materials and sold into the school market.

General educational products are redesigned and packaged for specific niche markets, such as special education or ESL. Tie-ins with successful print products are sought and exploited.

D. LITERACY MARKET IMPLICATIONS

This analysis of the educational software market illustrates how overall personal computer software industry dynamics play out in one specific segment of the market. It remains to be examined whether these same dynamics and patterns function in the literacy market, a niche of the overall educational market, which is itself made up of many disparate sub-niche markets.

1. Potential Participants

As is true for the institutional education market, the range of software applications which can be employed in the literacy market is very broad. Even adults functioning at the low end of the basic skills spectrum, can use a word processing program to accomplish their writing goals. Similarly, calculational tools can assist in the acquisition of mathematical skills. Open-ended problem-solving programs or broad ranging simulations can draw in adult learners and help them make the connections between academic skills and their everyday lives. As computer technology grows in power, the ability to use graphics and voice synthesis to overcome reading-level problems, particularly with LEP adults, holds out the promise of allowing even non-readers access to sophisticated computer applications.

Thus, literacy programs can turn to the same range of publishers for the purchase of software applications for use in instruction as do the K-12 schools. This includes:

- educational software publishers;
- consumer software publishers;
- educational textbook publishers;
- supplemental publishers;
- ILS vendors;
- business/professional publishers; and
- multimedia publishers.

In addition, given the nature of this marketplace, vendors who concentrate on various aspects of the training market (and/or work place literacy) might also

have products that can be used for literacy. So, too, do vendors who have traditionally made literacy their vertical market niche.

Despite this potential, it would appear that only companies with a traditional stake in the education and/or literacy markets will opt to be active participants in supplying software applications to this marketplace. Currently major purchases are being made from various ILS vendors and from traditional niche market suppliers such as Conover, BLS, and Educational Activities, among others. Some software, designed for use in the K-12 market, is also purchased, as are some text/software combinations published by traditional textbook publishers.

Like their K-12 counterparts, literacy programs also purchase software from the large business publishers (word processors, desk-top publishing tools, graphics, etc.) and from consumer publishers (edutainment packages, simulations, etc.). From the point of view of the suppliers, however, these sales continue to be serendipitous. Large business and consumer publishers do not view the market as of sufficient size to justify the costs of developing new distribution channels and the marketing programs to support them. Because the products of these companies are generally widely available, they will continue to be purchased and used in literacy programs, but this will be largely on the initiative of the supplier of literacy education.

2. Market Barriers

As noted above, market size is one barrier to entry into this market. If the $250 million K-12 market for software used in instruction has not lured major non-educational publishers actively into that market, it seems that only an even larger market would draw them into the literacy marketplace.

This market size problem is further complicated by fragmentation. Unique learner needs and program requirements divide the literacy market into many smaller subsegments, requiring at least some adjustment to materials offered to each segment. This has the potential of pushing up development costs and of multiplying the types of support needed by the market. Although training vendors have the structures in place to deal with the customization issue, they do not see this market as one in which they can recoup the costs associated with such services.

The fragmentation of the market also pushes up the cost of reaching the various market segments. Vendors must employ multiple distribution channels to reach these markets. K-12 schools provide a very specific and identifiable market. Purchasing patterns are well understood. It should be noted that most of the successful companies had some entree to the schools or had strong school contacts, as in the case of the teacher-founded companies, before they got into the software business.

Thus, even for software companies that have considerable expertise in cross-over marketing, the demands of the literacy market make entry problematic. Products moved from traditional education to the literacy market will demand substantial product revision. Distribution channels are not well established and it will be harder to create joint marketing ventures with hardware and peripheral vendors, because their grasp of the market is not as well developed.

At present, market factors are such that, as noted above, only those vendors with a traditional stake in the education/literacy market are participating as active competitors. The market does not appear to be able to attract the variety of developers and publishers whose products might form the basis of innovative or non-traditional approaches or even to stimulate such product development on the part of current players. Moreover, the established market approach does not address the problem of reaching populations that do not participate in established literacy programs.

Consumer publishers and the distribution channels they command may, ultimately, be more effective in this hard-to-reach segment of the literacy market. The current flurry of activity surrounding the development and release of interactive consumer products (e.g., CD-I, CD-TV) point to the potential for a future product platform that could rival the growing presence of game machines such as Nintendo. At the same time, competition and the search for new markets are causing Nintendo and other entertainment-oriented consumer electronics manufacturers to extend the reach of their products by developing educational and general interest programming. The hand-held market is also seeking growth and the advent of personal, digital assistants is extending the reach of these devices beyond spelling and address-book functions.

All of these products need a wide range of engaging and practical application software if they are to succeed. However, they hold the potential for the growth of a large base of interactive equipment which could be used to engage, enlighten, and inform customers. Products developed to address literacy problems, possibly linked to broadcast television programming, could reach large numbers of learners. The economics of this are not clear, since many people in the potential audience do not have the economic resources to purchase the support ongoing use of such products. In addition, no consumer product has ever been put to serious educational purposes, although many were originally conceived with this in mind. This approach to literacy education would seem to require both policy changes and the commitment of the major consumer electronics companies.

Subsequent chapters of this report will discuss the various submarkets subsumed under the literacy market and estimate their funding levels and levels of technology use. The views of current vendors will be reported and analyzed. Possible policy options will be presented along with scenarios that illustrate the potential impact of implementing these options.

II. ADULT LITERACY

Within the overall education software market is a small but growing component devoted to adult literacy. Defining this component, however, can be a difficult task. From a practical standpoint, the adult literacy market consists of a number of smaller niche markets ranging from school-operated programs, to colleges, to prisons, to job preparation. In fact, one of the most notable features of the adult literacy software market is its lack of easily defined structure. Below, we highlight the new National Literacy Act of 1991 and describe the relevant literacy market niches.

A. THE NATIONAL LITERACY ACT OF 1991

Public Law 102-73, known as the National Literacy Act of 1991, devotes considerable attention to defining the concept of "literacy" and providing support mechanisms for achieving greater literacy nationwide.[21]

An introductory section of the Act establishes a national definition of literacy that differs from many past definitions in certain ways. This definition does not rely on grade levels nor is it limited to reading and writing. It clearly includes English as a second language. It defines literacy in functional terms, relative to the needs of each individual.

Title I of the Act amends the Adult Education Act to create a National Institute for Literacy. The Institute will have five major areas of operation:

- basic and applied research;
- program assistance, technical assistance, and training;
- policy analysis and evaluation, including the creation of a data base on adult and family literacy and other programs to upgrade the basic skills and literacy levels of adults;
- dissemination of information about best practices in literacy programs using various means of instruction; and

---

21. This summary draws heavily from an analysis prepared by the Southport Institute for Policy Analysis.

- assistance to Federal agencies in implementing the Act and in finding ways to achieve uniformity among reporting requirements, develop performance measures, and develop standards of program effectiveness.

Title I also establishes State/Regional Literacy Resource Centers to link the National Institute to program providers, upgrade the system of diffusion and adoption of state-of-the-art teaching methods, assist in coordinating the literacy system, provide technical assistance to states and local governments and service providers, encourage government-industry partnerships, and provide training to literacy instructors. No more than ten percent of each state's grant can be used to purchase hardware and software.

Title II of the Act establishes a National Workforce Literacy Assistance Collaborative to improve the basic skills of the currently employed, especially those workers (with low basic skills) who are marginally employed. Title II also establishes a grant program for National Workforce Literacy Strategies to develop, test, and evaluate replicable large-scale national strategies based on local, regional, state-wide, and industry-wide partnerships between the public and private sectors.

The Act also assists the states and local programs in providing literacy services by investing in program improvement, expansion, coordination, and staff training. It amends the Even Start program to change the program name to "Even Start Family Literacy Program". It also authorizes $2 million for a contract with the Corporation for Public Broadcasting to develop and disseminate family literacy programming and related materials and encourages technology use in correctional education programs.

B. NICHE MARKETS

In this section we describe the market potential for software and multimedia programs in a number of niche market areas:

- Job Training Partnership Act/Job Opportunities and Basic Skills;
- correctional education;
- higher education;
- adult education;
- ESL/bilingual; and
- specialized niche markets.

Where information is available for these niche markets, we discuss estimates of current use of technology and the sales potential for technology-based products. We also identify product features which appear to be in high demand within the different niche markets.

1. Job Training Partnership Act/Job Opportunities and Basic Skills

Many Federal employment programs are sources of funding opportunities for adult literacy markets. The Job Training Partnership Act (JTPA) program consists of several components: (a) Title II(A), a remedial program for youth and adults; (b) Title II(B), a summer youth education and training program; (c) Title III, a program for dislocated workers (primarily remediation and training); and (d) Title IV, the Job Corps. While the total annual Federal allocation for the JTPA has been relatively stable at about $3 billion, funding for remediation/basic skills training has increased from $30 million in 1987 to approximately $550 million in 1991, due largely to a 1986 Congressional mandate to assess each participant and provide remediation when needed. Several proposed legislative amendments for the JTPA system are under consideration, including: (a) greater emphasis on "individuals most in need"; and (b) modification of the eight percent set-aside program, now operated by state departments of education, which would result in a smaller amount of funding but greater flexibility for innovative programs to be operated under Governors' offices.

The JTPA system is both process and product oriented. Processing steps, through which an individual must proceed, range from recruitment to job placement; moreover, Service Delivery Areas/Private Industry Councils (SDAs/PICs) contract, on a performance basis, with service providers to achieve desired outcomes such as attainment of minimal basic skills, achieving a GED, or retention on a job three months after placement.

Under the Job Opportunities and Basic Skills (JOBS) program (Family Services Act of 1988), welfare parents -- particularly ages 24 and younger who do not have high school diplomas or GEDs -- must be enrolled in a GED or equivalent program before they can receive their AFDC welfare payment. Under the JOBS program, states must provide some matching funds to implement such programs. Total Federal appropriations in FY89 were $150 million, more than

$800 million in FY90, and estimated FY91 funding was about $1.0 billion -- excluding state matches (about $500 million was not allocated to states because of the lack of state matching funds). As of October 1990, all states are participating in this program. Funding for the JOBS program, in combination with JTPA basic skills funds, can be expected to increase over the next two years. Most providers of family and other literacy programs under JOBS will be the local JTPA providers.

The June 1991 report of the Secretary's Commission on Achieving Necessary Skills (SCANS)[22] identified five competencies and three foundation skills and personal qualities that are needed for solid job performance. While the report recommends that such skills be taught in schools and in other environments, the primary focus of these recommendations is the JTPA system. The five competency areas include:

- allocating time, money, and materials;
- developing interpersonal skills, working with teams and with people from culturally diverse backgrounds;
- acquiring and evaluating data, organizing files, interpreting data, and using computers to process the information;
- understanding social, organizational, and technological systems and designing or improving systems; and
- selecting equipment and tools, applying technology to specific tasks, and maintaining and trouble shooting technology.

The foundation skills and personal qualities include:

- reading, writing, arithmetic, speaking, and listening;
- thinking creatively, making decisions, solving problems, knowing how to learn, and reasoning; and
- involving personal qualities, including individual responsibility, sociability, self-management, and integrity.

While some overlap exists with some of the existing competencies being taught in the JTPA system as well as other programs, the SCANS critical skills could

---

22. U. S. Department of Labor, What Work Requires of School, a SCANS Report for America (Washington, DC: June 1991).

constitute a comprehensive set of potential modules which could be provided to learners in multimedia formats.

a. Use of Technology

In 1986, a survey of SDAs, conducted by the Center for Remediation Design (CRD), reported that 51 percent of the SDAs were using some type of computer-assisted instruction in their Title II(A) and (B) programs, while 37 percent used CAI in combination with traditional pencil-and-paper approaches.[23] A GAO survey, conducted in the Spring of 1987 on the Title II(B) Summer Youth Employment and Training Program (SYETP), found that 70 percent of the SDAs used computers as teaching tools during the 1986 summer program (see Exhibit 8).[24] Another survey by CRD, in 1988, reports CAI use in almost 80 percent of the SDAs. Many sites use ILSs/network systems.

Exhibit 8

DELIVERY APPROACHES TO TITLE II(B) PROGRAM

Delivery Approaches	Percent of SDAs 1986	1987
Taught individually	69	72
Lecture and discussion only	13	7
Individualized, self-paced only	21	26
Both lecture/discussion and individualized/self-paced	64	61
Computers as teaching tools	70	73
Instruction tied to work	57	60

Source: School Dropout Programs, GAO/HRD-87-108.

---

23. Education TURNKEY Systems, Inc., The Job Training Partnership Act and Computer-Assisted Instruction (Washington, DC: National Commission for Employment Policy, August 1988).

24. Ibid.

The use of computers for direct instruction or instructional management within the JTPA Title II program is ideally suited to the various approaches and program configurations which SDAs and service providers follow. As noted in Exhibit 8, SDAs use "taught individually" and a combination of "lecture/discussion with individualized, self-paced instruction" often to provide remedial education in Title II(B). As GAO reported, 43 percent of the SDAs provided ten or fewer hours of remediation per week, while 15 percent provided 20 or more hours. Moreover, Title II programs are operated on different schedules, particularly for out-of-school youth and adults in different environments and for different lengths of time. Given these configurations, there is a definite need for instructional service delivery which is flexible, self-paced, and capable of being operated with minimal instructional staff. These considerations provide unique opportunities for computer-assisted and computer-managed instruction.

b. Program Features

Although many computer delivery systems and integrated learning systems are expensive -- ranging in cost from $50,000 to $100,000 -- SDA officials and providers of remedial education programs under the JTPA Title II program have noted a number of reasons why such systems are advantageous:

- Independent evaluations[25] achievement gains are greater than in control groups, and time savings of 20 to 30 percent can generally be expected in achieving mastery levels.
- Some of the systems are easy to operate; hence, an instructional aide, trained in network operation, can be used to operate the system, thereby reducing the need for higher paid instructional staff.
- Most of the systems can provide the necessary information on student progress for completing performance and other reports.
- The systems' use of local area networks (LANs) can reduce the costs per unit of software, provide more options for staff, reduce disc management problems, and provide motivation to participants who wish to peruse high interest programs.
- Some vendors are willing to be paid, at least partially, on a student performance basis, thereby reducing the risk to the service providers who must meet, in most cases, minimal performance standards.[26]

---

25. Ibid.

26. Ibid.

Some important and desirable characteristics of programs for use in the JTPA system include:

- the degree to which the technology is individualized, self-paced, student-directed, and with open entry/exit capabilities to facilitate scheduling of various types of participants;
- the program is correlated with specific competencies which can be measured and included in performance contracts between service providers and the SDA;
- the vendor has a flexible pricing arrangement which allows for pay-back over an extended period;
- the degree to which the vendor is willing to share in some of the risk associated with student's achieving the projected gains; and
- an existing capability within the system to predict the likelihood of a participant completing strands, lessons, etc. within a time frame that can be used in projecting budgets and performance standards.

c. Technology Sales Potential

Assuming a ten percent annual funding increase for JTPA Title II, III, and IV programs over the next two years and an increased allocation for remedial programs (from $500 million to $800 million), a realistic projection for software/media sales is between $70 million and $90 million for the two-year period from 1990 to 1992. Between $60 million and $90 million was spent in 1989-90 on hardware, software, and integrated learning systems under JTPA's Title II and eight percent state set-aside programs. In 1989, $10-12 million was spent on such systems in Florida alone. TURNKEY estimates that JTPA technology funding for remediation, literacy, and related services will total about $200-225 million for 1991 and 1992.

2. Correctional Education

One of the small but growing markets for computer-based and multimedia educational programs is correctional institutions, including Federal and state prisons, youth correctional institutions, local jails, and county probation offices. Between 1980 and 1989, total numbers of inmates in correctional institutions nationwide increased from 330,000 to more than 680,000. At the present time, one million people are in prisons, jails, and juvenile facilities.[27] The organization of penal institutions vary among the states.

In some states, the Department of Corrections or its equivalent is responsible for both youth and adults, while, in others, separate authorities exist for the two populations. Funding cycles and sources of funds also vary, making it difficult to describe a homogeneous national correctional education market.

a. Education Programs

The 1,400 state correctional institutions nationwide provide numerous education programs. In 1983 (the year of the most recent comprehensive survey by the CEA): 98 percent of the states offered adult basic education in their institutions; 98 percent offered GED/high school equivalency programs; 91 percent offered vocational training; and 91 percent offered postsecondary education.

A limited survey conducted by the CEA in May 1989 found that 20 states have mandated literacy programs in correctional institutions and 18 other states have non-mandated literacy programs. The level at which an inmate is considered illiterate ranges from a low of fourth grade in Arkansas to a high of ninth grade in Florida. Over the last few years, this literacy level has tended to move toward a higher grade level.[28]

According to the Federal Bureau of Prisons (FBP), it provides a variety of academic programs, including adult basic education, GED, ESL, continuing education, occupational training, and postsecondary studies. In 1991, 11,140 inmates were enrolled in adult basic education, with 9,900 expected to complete the program. Of those who withdrew, about half did so voluntarily. Approximately 6,600 were new enrollees in the GED program, with about 4,290 expected to complete the course. More than 7,100 individuals who enrolled for the ESL program this year, approximately 1,600 more than last year.[29]

---

27. Correctional Education Association, "Fact Sheet" (Laurel, MD: 1991).

28. The Journal of Correctional Education, vol. 41, issue 2 (St. Paul, MN: Correctional Education Association, June 1990).

29. Federal Bureau of Prisons, unpublished reports, November 1988 and November 1990.

Education opportunities provided through the FBP range from basic literacy through postsecondary education, including a wide range of occupational training programs. Only one education program, literacy, is mandatory. In 1989, all Federal prisoners who tested below the eighth grade level on the Adult Basic Level Examination (ABLE) were required to enroll for 90 days in a basic education program. Inmates could opt out after 90 days; however, all promotions in Federal Prison Industries and institution assignments beyond the entry level grade are contingent on successful completion of a literacy program. In 1990, the Attorney General announced even higher standards for 1991 -- inmates will be required to master 12th grade academic skills. At that time, 20 percent of the 58,000 Federal inmates were estimated to have eighth grade or lower reading levels.[30] Tying literacy to promotions in institution-based and FBP jobs has proved to be a very strong motivational tool. Enrollments and completions in basic education programs have more than doubled since establishment of the mandatory literacy program. Similarly, enrollments in high school equivalency (GED) courses have also increased as more inmates complete ABE programs. GED programs are available in English, French, and Spanish.

In addition to state correctional institutions and Federal prisons, there are approximately 3,250 jails operated by counties and cities. A new national initiative is underway to establish model literacy programs for jails. Some of these programs are being operated in conjunction with local colleges and/or public libraries; others are operated internally by larger local jails. The average stay of an inmate in a jail is 45 days.

A small but growing number of county probation offices are beginning to mandate literacy programs for individuals who, as part of their parole requirements, are enrolled in programs leading to high school diplomas or GEDs. This is part of a larger movement institutes under the Family Services Act (JOBS program) which requires individuals to participate in such programs as a precondition for receiving welfare. Some of the case study respondents (noted below) indicated that parole offices like arrangements whereby parolees report in periodically, not only to meet with the parole officer, but also to receive instruction at the same location.

---

30. The Washington Post (Washington, DC: October 18, 1990).

Approximately one million inmates, at any given time, are currently in one of the above types of institutions; 75 percent of these individuals are illiterate. The provision of GED preparation and adult basic education programs has doubled in the last few years and can be expected to increase even more over the next two years. The number of inmates with limited English proficiency has also been increasing dramatically over the last few years.[31]

b. Funding

In 1990, state funding for correctional facilities and services increased 14.2 percent, the highest priority across all state programs.[32] The sources of funding for educational programs and purchases of technology vary considerably among the states. Many states allocate portions of their eight percent JTPA set-aside funds for literacy programs in prison systems (e.g., almost half of the set-aside is used for this purpose in Oklahoma and Louisiana). Nationally, the use of correctional institutions as JTPA service providers has increased for the last few years. (In Kentucky, for example, 45 percent of correctional educational funding comes from JTPA and other Federal programs.) Some institutions have used telephone company "surpluses" to finance the purchase of ILSs/networks. The largest funding increases occurred in Texas, Florida, Colorado, Arkansas, and Rhode Island. Only three states -- Alaska, Louisiana, and Tennessee -- reported cuts (compared to decreases in eight states the previous year). Clearly, state funding of correctional institutions has been on the increase and is expected to continue to grow in the near future, although education components will increase at a lower rate.[33]

Another source of Federal funding is the Adult Basic Education (ABE) Program of which ten percent, under the Adult Education Amendments of 1988 (P.L. 199-297), must be set aside for educational programs in correctional institutions. Knowledgeable officials indicate that, during the last year,

---

31. Correctional Education Association, op. cit. No. 26.

32. National Conference of State Legislatures, State Fiscal Outlook (Denver, CO: 1991).

33. Ibid.

most of this "earmark" was allocated to correctional education programs in states that matched the Federal ten percent.

The National Literacy Act of 1991 establishes mandatory literacy programs for incarcerated individuals who, "to the extent possible make use of advanced technologies" (Section 601). The legislation also establishes "blue ribbon awards for correctional education programs". Both of these programs are to be supported by one or more Federal grant to states and institutions that qualify. These amendments also create a life skills training grant program, which will provide grants to eligible institutions to assist them in establishing an operating program designed to reduce recidivism through the development and improvement of life skills necessary for reintegration into society.

The total FBP budget in FY89 for education programs was estimated to be $32 million, of which approximately $5 million went to Unicorn, which operates facilities within the FBP system. Approximately $20 million was spent on academic programs, while $8 million was spent on vocational programs. About $8 million of the total was spent on instructional materials and equipment, including technology programs.

c. Current Computer Use

Of all correctional institutions, the FBP is the most extensive user of technology-based programs. By 1991, 35 of the 65 FBP facilities used integrated learning systems (ILSs). In addition, 15 new prison installations are in the process of being built. In nearly all cases, budgets for educational programs have been increased to allow for such technology purchases as ILSs.[34]

Some technology-based education initiatives appear to be a function of state-level leadership and the availability of funding. In the mid-1980s, New York, under the leadership of the Center for Learning Technologies (CLT), selected and tested a technology configuration consisting of: an Apple platform, Corvus hard disc and network, and the Ideal Learning Management

---

34. Personal interview with Federal Bureau of Prisons' official, September 1991.

System with Ideal software. Today, more than 50 correctional institutions throughout the State use this system.

A number of southeastern states have increasingly used JTPA and state funds to establish programs which use stand-alone computers extensively in correctional institutions programs. Many states (e.g., Michigan) have recently installed large configurations (e.g., IBM PALS) in their correctional institutions. Still others have relied on local companies' products (e.g., the PLATO LDS system) in Minnesota.

The amount of education programming in jails is increasing as a result of the National Literacy Initiative, primarily in the larger jails across the country. Because the average length of stay in a jail is only about 45 days, literacy programs must be open entry/exit, individualized, and self-paced; this creates a market for network and ILS programs. Some jail-based literacy programs are contracted out to junior colleges and public libraries. Most of the larger jails already have computer modem hook-ups to tap into on-line police data bases.

In 1989, The Journal of Correctional Education conducted a survey of technology interest and use among CEA members and reported its findings in the Journal in June 1990.[35] Although the response rate was low (118 members from 35 states), the findings suggest some trends in the use of technology in correctional education programs.

Respondents were most interested in information about educational software in the following areas:

- basic literacy;
- GED;
- adult basic education;
- writing; and
- tool applications (e.g., word processing, desk-top publishing).

Special education and ESL were priorities in certain areas of the country.

---

35. The Journal of Correctional Education, op. cit. No. 27.

Respondents identified the following priority information needs:

- software reviews and software preview libraries (34 percent);
- public domain software (12 percent);
- Federal and state funding (11 percent); and
- data base resources (ten percent).

Approximately 25 percent of the respondents reported having terminals in their education areas to access data bases and indicated they would be interested in specific information, accessible through data bases, on:

- funding sources;
- practical education applications/advice;
- software reviews; and
- education ideas exchange.

Currently, the primary sources for information about technology are:

- catalogs (40 percent);
- word of mouth (36 percent);
- journals (12 percent); and
- exhibits (12 percent).

Where appropriate technical expertise exists, some correctional institutions are designing network configurations incorporating third-party software. This approach allows instructors to pick and choose the software that can provide motivation and counseling beyond the basic remediation and skill development offered by most ILSs. Knowledgeable officials believe that local institutions will increasingly lean toward networks.

d. Design Features

The specific functional areas offer opportunities for software and multimedia programs.

- **GED Preparation** -- In many state correctional institutions and in all Federal Bureau of Prisons' installations, inmates must achieve an eighth grade level score in each of six subtests on the Adult Basic Level Examination (ABLE). Spanish-speaking inmates may take the Spanish version of the CTBS. In order to qualify for the highest pay scale, an inmate must have a GED or high school equivalent. (About 25 percent of GED students are also enrolled in ESL programs.) Hence, an effective GED preparation program should be a major component of a technology-based program for correctional institutions, as it becomes the FBP standard.[36]

- **(2) Training** -- The major occupational training areas offered in Federal and state correctional institutions include building trades, heating and air conditioning, and automotive mechanics; the use of such programs as computer-assisted drafting and electronics are increasing. As with most occupational training and career assessment areas, the potential for applications of technology-based programs are great. To the extent possible, literacy skill development should be integrated into the occupational training as language-experience based programs. Program formats -- developed for such other markets as corporate literacy training, general work place literacy, and JTPA -- could be used with minor modification for correctional institutions.

e. Projected Market Potential

We estimate that the expenditures for education and directly related activities in all three types of institutions in 1990 was approximately $1.1 billion. In state correctional institutions, approximately $500 million was spent on academic programs (excluding job training and preparation) in 1990. This estimate is based on state budget information provided to the CEA by 35 states. For some states, Federal funds earmarked from adult education and JTPA were included in this estimate. During the same time period, the funds allocated to academic programs in the Federal Bureau of Prisons was approximately $35 million, and the American Jailers Association estimated that, in their 3,300 jails across the country, approximately $80-100 million was expended on academic programs. Ryan (1987) found that only three to four percent of a correctional institution's budget is generally spent on education.[37] While figures are not available on funds allocated to job preparation and training programs, knowledgeable individuals estimate that two to three times the amount spent on education is allocated to such training programs and increasingly literacy programs are being tied directly to vocational training areas. We estimate that an additional $500 million for basic education programs in correctional institutions comes from this source. In many cases, purchases of technology-based products, particularly those involving literacy and basic skills tied to vocational areas, are purchased out of both training and education budgets.

---

36. Federal Bureau of Prisons, unpublished report, November 1990).

37. T. A. Ryan Correctional Education: A State of the Art Analysis (Columbia, SC: University of South Carolina, July 7, 1987).

Of the estimated $1.1 billion allocated for education and related programs in 1990 in more than 6,500 local, state, and Federal institutions, approximately $100 million was spent on educational technology -- many of which are integrated learning systems or have been designed specifically by states for use in prisons. Over the last five years, correctional institutions have been the largest growth line item in state budgets -- approximately 15 percent annually, with a doubling of the inmate population over the last five years. Federal funding for new facilities under "war on drugs" initiatives suggest that total Federal and state funding will probably increase by approximately 40 percent over the next three years. This should result in educational and related expenditures of about $1.7 billion in 1994-95. Since most new facilities include funds for instructional materials and equipment, one can anticipate the projected total market for technology products in three years will be between $140 million and $170 million. Between $50 million and $70 million will be spent on software and related programs, including software components of ILSs.

3. University/College Literacy

Community colleges, as well as postsecondary technical schools and four-year colleges and universities, represent emerging markets for programs which provide: (a) remedial basic skills for entering first-year students; and (b) basic education and literacy programs for adults. In many states, community colleges operate programs funded by a variety of sources, including:

- Federal ABE programs for GED programs under contract with local employers and/or SDAs/PICs;
- remedial basic skills programs funded under state programs;
- JTPA Title II, Title III, and eight percent set-aside funds;
- state funds under contract to local correctional agencies; and
- Federal programs, such as Title III (Strengthening Developing Institutions).

a. Participation

Many entering first-year students at institutions of higher education require some kind of remediation in basic subjects -- reading, writing, or

mathematics. As shown in Exhibit 9, more than one-third of all freshmen entering two-year institutions in 1989 required remediation in at least one subject. Even in four-year schools, nearly one-quarter of entering freshmen required remedial education in at least one of the basic subjects. First-year students at public institutions tended to require remediation more often than those at private institutions and schools in the central region of the country saw lower percentages of students needing remediation than schools in other areas of the country.

Exhibit 9

PERCENT OF ENTERING FRESHMEN ENROLLED IN REMEDIAL COURSES

Characteristic of Institution	Percent of Students Requiring Remediation In			
	Reading	Writing	Mathematics	At Least One Subject
Type				
Two-Year	16	20	26	36
Four-Year	19	12	15	24
Control				
Public	13	17	23	32
Private	12	11	12	22
Region				
Northeast	13	18	20	33
Central	10	13	19	23
Southeast	16	14	23	31
West	13	17	22	34

Source: College-Level Remedial Education in the Fall of 1989, National Center for Education Statistics (NCES 91-191), May 1991.

A 1988-89 study by the Southern Region Education Board (SREB) suggests that these percentages may be substantially understated. As shown in Exhibit 10, remediation in mathematics, for example, was required by 39 percent of entering freshmen at public institutions in southeastern states, considerably higher than the 23 percent indicated in the NCES study (Exhibit 9).

Exhibit 10

PERCENT OF ENTERING FRESHMEN IN PUBLIC INSTITUTIONS NEEDING REMEDIAL COURSES

	READING			WRITING			MATHEMATICS		
State	2-Year	4-Year	Total	2-Year	4-Year	Total	2-Year	4-Year	Total
Alabama	32	11	24	34	13	25	45	20	34
Arkansas	43	39	41	40	38	39	65	52	59
Florida*	24	6	23	26	8	25	47	9	45
Georgia	32	21	24	53	25	34	52	31	38
Kentucky	22	20	21	28	27	27	47	37	43
Louisiana	24	20	21	30	26	27	55	46	48
Maryland	23	23	23	39	23	31	46	26	36
Mississippi	32	17	22	20	22	21	38	26	30
No. Carolina	33	23	31	37	17	32	41	20	36
Oklahoma	40	18	33	34	9	24	52	15	38
So. Carolina	25	18	23	24	14	20	32	26	29
Tennessee	47	15	36	41	18	33	67	28	53
Texas	36	14	31	35	17	29	52	25	43
Virginia	29	14	23	30	14	23	37	18	29
West Virginia	41	19	22	52	24	28	69	40	44
All States	32	18	27	34	19	28	47	27	39

* Florida law prohibits four-year institutions (except Florida A&M) from offering remedial courses

Source: "They Came to College?", Issues in Higher Education, Southern Regional Education Board, 1991.

The substantial numbers of entering students who required remedial services have caused most institutions of higher education -- both two-year and four-year -- to offer remedial courses in basic subjects. Exhibit 11 shows the percent of institutions, by certain characteristics, that offer remedial courses in reading, writing, and mathematics. It is noteworthy that, while the central region has the lowest percentage of entering freshmen needing remediation (see Exhibit 9), it has the highest percentage of institutions offering remedial programs.

Exhibit 11

PERCENT OF INSTITUTIONS OFFERING REMEDIAL COURSES

Characteristic of Institution	Percent of Institutions Offering Remedial Courses In			
	Reading	Writing	Mathematics	At Least One Subject
Type				
Two-Year	82	84	84	90
Four-Year	41	53	57	64
Control				
Public	82	87	89	91
Private	34	44	47	58
Region				
Northeast	48	59	61	67
Central	62	70	74	82
Southeast	60	62	65	73
West	60	69	71	74

Source: College-Level Remedial Education in the Fall of 1989, National Center for Education Statistics (NCES 91-191), May 1991.

b. Funding/Expenditures

Data on funding for adult literacy in higher education, particularly community colleges, is sparse. Using basic estimation values, Exhibit 12 gives estimates of expenditures on technology for remediation for entering first-year students, by subject and type of school.

Within the community college niche is a Federally-funded program for the disadvantaged known as the "Title III Program". It is designed for colleges with large numbers of minority and disadvantaged students, often the result of open admissions policies and related special programs. One of the largest components is a grant program for "developing institutions", funded in FY91 at approximately $88 million, of which $50 million is earmarked for two-year colleges. While the average grant is approximately $250,000, some are as large as $500,000, usually funded for three to five years. Approximately 300 colleges received grants in September 1989. Individuals who have reviewed

Title III proposals estimate that 90 percent of these grantees proposed to use computers for instructional purposes, primarily remedial.

Exhibit 12

ESTIMATED EXPENDITURES FOR TECHNOLOGY IN REMEDIAL INSTRUCTION FOR ENTERING FRESHMEN*
(000 dollars)

Type of Instruction	SUBJECT: Reading	Writing	Mathematics	Total
Two-Year	$1,710	$2,138	$2,779	$6,627
Four-Year	1,056	1,408	1,760	4,224
Total	$2,766	$3,546	$4,539	$10,851

* Based on estimates of $250 per student course and four percent of total cost devoted to technology (hardware and software).

c. Current Computer Use

The current use of computer-assisted instruction for remediation in community colleges and four-year institutions is difficult to assess because no formal survey with this focus has been conducted. Knowledgeable individuals with whom we discussed current and projected use generally conclude that:

- While virtually all colleges use computers for some type of instruction, less than half are using computers for remediation.
- Most current use is limited to a small number (perhaps four to six) computers in one physical location (e.g., a resource lab); the number of networked programs has recently begun to increase as administrators view this as a means of reducing disc management problems and courseware costs.
- The number of network or ILS configurations can be expected to grow rapidly, especially in states where recently passed legislation requires that such remediation sources be provided to students in need (e.g., Texas) and as more community colleges reduce entry requirements (e.g., open admissions).

- A major bottleneck thus far has been the lack of literacy software designed specifically for community colleges and their target populations (at-risk youth and illiterate adults). Software designed for the junior-high level is not appropriate.

- The most effective software will be modular programs which lend themselves to individualized, self-paced, participant-directed instruction.

4. Adult Education

The Federally-supported Adult Education Program consists of adult basic education (ABE), adult secondary education (ASE), and English as a Second Language (ESL), all targeted at the more than 50 million Americans who are older than 17 and who are out of school lacking a high school diploma.

a. Participants

The Adult Education Program supports about 3,000 local projects (service providers) which vary widely with respect to size and staffing. Many are small (just two or three part-time teachers) and provide service at only one site, while a few are very large (staffs in excess of 100) and operate extensive networks of service sites. Nearly all projects offer adult basic and adult secondary education training, and those in communities with significant language-minority populations also provide training in English oral-language skills (ESL). Nationally, ESL enrollments now account for about 35 percent of the total, with the balance being divided between ABE and ASE. The ASE component is limited to 20 percent of Federal program funds and is further distinguished by a nationally uniform definition of the goal of such training -- passing the General Educational Development (GED) test.

b. Funding

The Adult Education Program makes formula grants to the states and, operating under approved state plans, these funds plus matching state funds are distributed to about 3,000 service providers -- school districts, community colleges, and other community-based organizations. In recent years, states have reported matching expenditures for adult education in excess of $300 million -- roughly three times the Federal contribution. About three

million adults receive some service over a 12-month period, at an average cost of between $150 and $200 per participant.

As shown in Exhibit 13, Federal funding has risen sharply in recent years.

Exhibit 13

GROWTH OF THE ADULT EDUCATION PROGRAM

Fiscal Year	Enrollees (millions)	Federal Funding (millions)	State/Local (millions)	Total Cost (millions)
1967	.389	$ 26.3	$ 8.3	$ 34.6
1972	.820	51.1	17.4	68.5
1977	1.7	71.5	41.9	113.4
1982	2.2	100.0	128.6	228.6
1987	2.9	112.9	403.5	516.4
1992	3.6*	238.8	560.0*	798.8*

* Estimate

Source: Adult Learning & Literacy, Office of Vocational and Adult Education, U. S. Department of Education, 1991.

This increased support for the program is largely a response to heightened national concerns about adult illiteracy. Two other expressions of these concerns are a rise in the numbers of literacy volunteers at the local level and a new mandate for a national survey of adult literacy. Thanks to increasing numbers of volunteers, the capacity of existing literacy programs has been substantially enlarged; but with heightened awareness of the problems associated with illiteracy, the demand for services may have also increased. Whatever the level of effective demand for literacy services, all experts agree it is only a fraction of the total need, since many adults with literacy deficits never come forward to seek help.

Assuming that two percent of total adult education program funding is devoted to hardware and software, the market for such technology in 1992 might approximate $16 million.

5. ESL/Bilingual Education

The ESL/bilingual market for technology-based software and programs cuts across many of the above market niches and K-12 generally because of increased participation by limited English proficient (LEP) children and adults.

Funding for the Title VII bilingual grants program (which includes Family English Literacy programs) has increased from approximately $115 million in FY90 to $121 million in FY91. In addition to Title VII, bilingual programs are also operated under Chapter 1, state bilingual programs, and earmarked components of several adult basic education and literacy programs. Total Federal funding allocated to ESL/bilingual programs has increased more dramatically than under Title VII. In 1986, approximately $650 million was allocated across more than ten Federal programs to ESL/bilingual programs for children, youth, and adults.[38]

a. Use of Technology

In 1982-83, ten percent of projects funded under ESEA Title VII used computers; this increased to 44 percent by 1985-86. Approximately $11 million went to projects funding CAI demonstrations in 1984.[39] While information on the percentage of projects funded in 1991 using technology is not available, one might anticipate a significant increase since 1986 to approximately 60-70 percent.

b. Market Potential

The market for technology-based solutions in the ESL/bilingual arena has increased greatly since 1985 and will continue to increase over the next five years as a result of a growing and recognized need, as well as market creation efforts by some software publishers.

---

38. U. S. Congress, Office of Technology Assessment, Power On! New Tools for Teaching and Learning (Washington, DC: U. S. Government Printing Office, September 1988).

39. Education TURNKEY Systems, Inc., The Limited-English-Proficiency Education Market (Falls Church, VA: Feb. 16, 1988).

In February 1988, TURNKEY projected that, by 1990-91, the installed base of computers in all K-12 bilingual programs would be approximately 120,000. We believe that the current installed base is somewhat higher than our initial projection, or about 150,000.

We estimate that total technology sales in the K-12 ESL market niche increased from approximately $18 million in 1985-86 to $80 million in 1990-91. Approximately $16 million of software was purchased for use in schools with K-12 LEP populations in 1990-91. Another $1 million of software was locally developed and disseminated through Federal bilingual dissemination centers and other projects. By 1991-92, we project that ESL software sales, including ILS strands focusing on foreign language/ESL, should be between $20 million and $25 million. We estimate that only 10-15 percent of sales will be for adult ESL populations.

Rapid growth can be expected in market niches beyond K-12. In the correctional education market, we estimate that the total 1990 expenditure for hardware, software, and instructional materials in correctional ESL programs was $7 million. Total estimated expenditures for ESL materials and software is currently about $2.8 million. We expect this amount to increase in two years to $3.2 million.

In the college remedial and adult basic education markets, approximately $5 million was spent on programs for LEP populations; approximately $1.5 million of this was spent on software. By 1992, it should double or triple as the installed base increases. Only 12 percent of existing programs use computers extensively.

In JTPA programs, approximately $15 million was spent on technology in programs involving LEP participants. Of that amount, $3 million or $4 million was spent on software, including ILS/ESL programs. Over the next two years, this amount should more than double to $10 million.

6. Other Specialized Markets

In addition to the niche markets described above, a number of other specialized areas support adult literacy programs. These include early

childhood programs (to reach parents), volunteer and community-based programs, and employer-based programs.

a. Child-Parent Education

One of the fastest growing potential markets for software and multimedia products is the emerging child-parent literacy program.

Child-parent education programs can attract parents to literacy training programs, particularly those who, because of embarrassment or for other reasons, would be unwilling to enroll in an adult literacy class. Recently, there has been an increase in the number of such programs.

Although a myriad of approaches exist, most intergenerational programs have several common elements. Parents generally receive literacy and parenting instruction, while children receive a comprehensive child development program. Parents usually go to the center with their children; however, a number of these programs include home-based components.

Spurred by the Federal Even Start program and counterpart laws in 30 states, the estimated number of intergenerational projects has increased from fewer than 1,000 in 1987 to nearly 6,000 in 1990.[40] Beyond the legislative impetus for such growth, this expansion can be attributed to: (a) a shift in the focus of Federal funding to intervention and prevention programs at early childhood levels where there is a greater impact for the dollars invested; (b) school districts and other service providers (e.g., community-based organizations) seeking to establish track records in order to obtain funding under new or expanded Federal programs, such as JOBS and JTPA; (c) proposed Federal legislation and policy support within Congress and the Administration; and (d) reallocation of state funds to intergenerational programs.

Non-school-based service providers are also beginning to provide parent-child education. Some national chains are establishing "family learning centers" for disadvantaged parents and children to take advantage of the projected funding under the JOBS program (created under the Family

---

40. Education TURNKEY Systems, Inc., Study of the Pre-Kindergarten Education Market (Falls Church, VA: February 1990).

Services Act) and an increased emphasis on parent education under Adult Basic Education and the new Individuals with Disabilities Education Act (IDEA) of 1990. Also, national community-based organizations are planning to expand their family learning centers under the JTPA system.

As displayed in Exhibit 14, funding for major programs supporting parent-child education has increased significantly over the last few years. A 1986-87 survey conducted by Bank Street College found that only five percent of public school prekindergarten programs had "parent education" components.[41] We believe that now between ten and 15 percent of these and other preschool programs (e.g., Even Start, Head Start, JTPA/JOBS) have such components. Three of Head Start's six current priorities relate to family literacy; some of the proposed new funding for Head Start will be allocated to parent-child education programs, including functional literacy. A recent survey of Even Start demonstration programs found that 90 percent of these projects provided parenting education and more than 90 percent provided services to prepare adults to attain a GED.[42]

In July 1990, the Federal Head Start office lifted a moratorium on the use of Head Start funds for the purchase of computers for developmentally appropriate instructional activities. In both Even Start and Head Start, the number of programs currently using software for parent-child education has increased, although not as rapidly as some industry forecasts. Because of increased funding and the availability of software which can be interfaced with sound cards, adapted input devices, and other assistive technologies, the use of technology in *special education* preschool programs is greater than all other preschool programs combined.[43] Emerging from the IDEA provisions allowing such funds to be used for literacy and related purposes, the use of technology to address parent literacy in special education preschool programs is relatively new.

---

41. Anne Mitchell, The Public School Early Childhood Study: The District Survey (New York, NY: Bank Street College of Education, 1988).

42. Abt Associates Inc. and RMC Research Corporation, National Evaluation of the Even Start Family Literacy Program, prepared for the U. S. Department of Education (Cambridge, MA: Oct. 28, 1991).

43. Education TURNKEY Systems, Inc., op. cit. No. 39.

Exhibit 14

Federal Funding: Program Support Parent-Child Education*
(millions of dollars)

Department of Labor	FY 1991	FY 1992
Training and Employment Services		
Block Grants	1,778	1,773
Summer Youth Employment	682.9	682.9
JTPA/JOBS (Remedial est.)**	550	600
Department of Health and Human Services		
Head Start	1,952	2,202
Department of Education		
Even Start	49.8	70
Special Education (EHA/IDEA)		
Preschool	293	320
RSA Technology Assistance	21	28

* Compiled by Education TURNKEY Systems, Inc.

** Estimated funding for remedial/literacy programs

Opportunities for technology- and media-based products in intergenerational programs offer great potential because: (1) technology and media use in adult literacy programs is currently growing rapidly; and (2) pre-academic programs can in many cases be created as an adjunct to a technology-based literacy program with low marginal costs. Current bottlenecks are the limited number of software titles for parent-child education programs (particularly those teaching parenting skills) and the meager amount of research on characteristics of effective programs in this area.

b. Community-Based Organizations/Volunteer Literacy Programs

Another adult literacy market niche is constituted by community-based organizations (CBOs) and literacy volunteer organizations, of which the Association of Community-Based Education (ACBE) estimates that between 5,000 and 7,000 operate in communities across the country. Most of these

organizations are local, grassroots organizations that "spring from the communities they serve".[44] In some cases, these organizations are franchises or partners of national or regional nonprofit entities which provide training and other support to their operations. A 1988 survey by the ACBE found that 45 percent of the community-based organizations are affiliated with national groups. Some states have also created programs specifically to funds CBOs and literacy services. For example, New York currently funds 53 CBOs to provide literacy services.

One of the more active literacy volunteer organizations is Literacy Volunteers of America (LVA), which has slightly more than 400 local affiliates. While the budgets of these affiliates range from approximately $10,000 to $350,000, the average annual budget is between $50,000 and $75,000. This use also includes affiliate LVA-operated programs in public and school libraries in the evenings which have an installed base of computers. In addition to private sources and contributions, LVA affiliates -- particularly the larger, incorporated ones -- apply for grants from a number of funding sources such as state ABE programs, Federal ABE programs through states, and the JTPA and JOBS programs.

Established in 1968, the Laubach Literacy Action (LLA) has a network of approximately 1,000 local member groups that reach more than 140,000 individuals. Local Laubach programs provide instruction in basic literacy, ESL, and math -- usually in one-to-one or small group settings which, in many cases, are unique to meeting the needs of the community. LLA has a network of 5,000 volunteer trainers and works with its publishing division, New Readers Press, to develop instructional materials and provide technical assistance and volunteer program management materials. LLA receive financial support from individual donors, corporate and foundation grants, membership dues, and sales of New Readers Press' materials.

Two of the largest organizations having linkages to the 5,000 to 7,000 CBOs are the ACBE, which has 120 members and a network of 6,000, and the Literacy Network, which currently has approximately 450 members and was officially chartered in 1989.

---

44. ALL Points Bulletin, Vol. 2, No. 3, August 1990 (Washington, DC: U. S. Department of Education), p. 2.

ACBE maintains an on-line data base of information, conducts evaluation and training, and has a mini-grant program to cover start-up costs or improvements. Total funding provided for start-ups to date has been less than $1 million. One of its highest priorities has been to improve the capabilities of CBOs' literacy teachers and administrators through demonstrations and technical support.

The Literacy Network includes many CBOs, individuals, and consultants who assist agencies in building a capacity through collaborative initiatives. The Network is an important information exchange, and many of its consultants provide training, technical assistance, policy development, and advocacy for local and state programs responsible for literacy training. In the recent past, it has attempted to enhance coordination between the varied and often fragmented delivery systems across the country.

The growth of volunteer services in adult basic education has increased approximately 120 percent during 1985-1989 to slightly more than 75,000 volunteers in 1988. Approximately 40 percent of volunteers were in support roles such as child care, clerical, and teacher aides, while 60 percent could be classified as volunteer tutors. Most received between 12 and 18 hours of training in the materials used by the service provider with whom they were associated. In addition to Laubach Literacy Action and Literacy Volunteers of America, other umbrella groups for volunteers include Project Literacy U.S. (PLUS), Retired Senior Volunteer Program (RSVP), VISTA Volunteer Literacy Corps, and state literacy councils.

A number of states have taken initiatives in the volunteer area. One such program is Florida's, which created the Adult Literacy Plan, which has a large component for using trained volunteer instructors. Washington State allocated almost $500,000 to hire 25 volunteer coordinators to recruit and train volunteers and to establish literacy councils. Other states allocating between $200,000 and $300,000 to volunteer efforts include Alabama, Kentucky, Nebraska, Pennsylvania, and Tennessee.[45]

---

45. U. S. Department of Education, Status Report on Adult Education and Literacy Volunteers (Washington, DC: May 1989).

The current and potential use of software and multimedia by CBOs varies considerably as to the sources of funding. For example, some CBOs are using open entry/exit, individualized, participant-directed, and computer-managed and computer-assisted basic skills programs. On the other hand, some of the other groups (e.g., Laubach, Literacy Volunteers of America) heavily involved in providing literacy services continue to provide more of their traditional types of programs, which are generally more labor-intensive, for illiterate adults, reflecting the volunteering nature of services and are usually provided at a much lower cost per participant hour of instruction than the larger CBOs.

c. Employer Programs

It has been estimated that as many as 20 percent of American workers are deficient in the basic skills needed to interpret and apply work place information. Only a few firms, however, offer corporate basic skills training.

In a recent survey conducted by the Harris organization (September 1991), no more than 14 percent of employers surveyed reported having an "organized program of job training, of which a major part is teaching basic skills such as math, reading, and writing to raise the level of functional literacy".[46] Moreover, only 33 percent of surveyed employers reported that recent high school graduates have "the ability to read and understand written and verbal instruction".

Estimates of the size of the market for industry-sponsored education vary greatly. According to the American Society for Training and Development (1991), industry-sponsored education and training is estimated to cost about $30 billion annually, of which about $220 million is spent by employers on literacy programs.[47] The National Alliance of Business estimates that

---

46. The Harris Education Research Center, An Assessment of American Education: The View of Employers, Higher Educators, the Public, Recent Students, and Their Parents (New York, NY: Louis Harris and Associates, Inc., September 1991).

47. Carnevale, op. cit. No. 13.

employers and unions operate literacy programs costing about $2 billion, with funding coming from a variety of sources beyond their own.[48] The Office of Technology Assessment estimates that the total amount spent by employers, government agencies, and unions on improving employee basic skills does not exceed $1 billion annually.[49] Using OTA's estimate (approximately $1 billion), under the assumption that industry-sponsored education and training tends to be more capital-intensive than school-based programs, it may be estimated that two to three percent of such expenditures are for instructional materials and equipment, or approximately $20-30 million annually.

C. ANALYSIS OF NICHE DIFFERENCES

The three **major** literacy niches in which technology is being used -- JTPA/JOBS, correctional education, and college remediation/adult basic education -- present unique problems for software and other publishers. Below we summarize some of the unique characteristics of these niches and some of the major players.

1. JTPA/JOBS

One of the unique features of the JTPA system is that service providers of remedial, literacy, job march, and other programs operate under performance contracts with PICs. On one hand, this type of accountability has created a demand for technology-based systems that have strong diagnostic/placement capabilities that can consistently produce gains in predictable time frames. On the other hand, such use of performance standards is perceived by some as providing disincentives for service providers to serve participants in greatest need (e.g., those requiring literacy training). Generally, this literacy market niche is risky for providers because it creates disincentives for investment in high-cost, technology-based products, particularly for literacy training. For example, service provider contract renewal is often influenced more by political factors than by prior performance in meeting

---

48. Personal interview, National Alliance of Business official, September 1991.

49. U. S. Congress, Office of Technology Assessment, Worker Training: Competing in the New International Economy, OTA-ITE-458 (Washington, DC: September 1990).

contractual requirements. While increased unemployment rates are likely to raise JTPA funding to states and, in turn, to PICs, priority services are more likely to involve job match for literate and trained, unemployed individuals than services for illiterate individuals. If literacy programs are created as a result of a major plant closing, they are generally considered "one-shot" opportunities; investment in technology-based solutions again tends to be minimized.

In order to overcome these risks and uncertainties, some PICs have invested in technology-based hardware, software, and facilities and, as the need arises, contract with service providers to operate the technology-based programs. Currently, no JTPA funds are specifically earmarked for investment in technology-based products for literacy and related programs.

A number of different types of firms have penetrated the JTPA market niche. U. S. BASICS, which develops and markets its computer-managed CCP program and ESL Center, has affiliates and partners who are JTPA service providers in approximately 300 of the 630 service delivery areas. Other prominent service providers are Opportunities for Industry Corporation (OIC) of America and SER-Jobs for Progress, Inc. Among ILS vendors, The Roach Organization (TRO) has increased its sales to JTPA service providers of the PLATO education system, building on the installed base established by Control Data Corporation (acquired by TRO in the late 1980s). In some states, Computer Curriculum Corporation (CCC) has a majority of ILS installations in JTPA programs operated by school districts and other service providers, particularly for youth programs funded under Title II(B). One strength of the CCC program is its capability to predict, with some degree of accuracy, the length of instructional time required for an individual learner to achieve predetermined performance levels. Another ILS vendor making substantial gains in this market over the last two years is Jostens Learning Corporation (JLC), which markets Project INVEST, developed specifically for adult literacy markets.

Some service providers and PICs supplement their literacy and related programs with software from a variety of publishers, including Educational Activities, Davidson & Associates, Broderbund, Conover, Hartley Courseware, and Skills Bank, among others.

Although all ILS vendors rely extensively on experienced direct sales forces, other software publishers usually market through a combination of direct mail, catalogues, and VAR relations with ILS vendors and national service providers. Several publishers (e.g., Skills Bank, Hartley Courseware) have relied heavily on dealers and independent sales representatives who specialize in JTPA/JOBS sales and distribution.

2. Correctional Education

Unlike the JTPA market, the correctional education market is easier to define (i.e., jails, Federal prisons, state correctional institutions), has grown steadily over the last five years, and is affected less adversely by recessionary economic conditions. Most Federal prisons and many state correctional institutions have a tradition of using technology-based solutions in their education and training programs; the Federal Bureau of Prisons has invested heavily in ILSs over the last five years. A significantly larger portion of the education budget in correctional institutions is invested in hardware and software than in the K-12 market and other literacy niches.

Correctional education differs from the JTPA market niche in many important respects. Unlike the JTPA system, in which service providers have performance-based incentives to improve participant literacy skills, the primary incentives in correctional institutions are provided directly to participants in terms of: (a) higher pay rates as they achieve higher educational levels (e.g., obtaining GEDs or high school diplomas); or (b) judges' decrees for parolees. Correctional institutions are much more structured in terms of individual scheduling and mandated program participation than are JTPA's open entry/exit education environments. Also, unlike JTPA PICs, Federal prisons and many correctional institutions have capital expenditure budgets for purchasing education-related hardware and technology which are increasingly included in construction funds for new facilities.

Associations representing correctional administrators and education staff tend to be much more active than those in the JTPA system. Associations such as the Correctional Education Association and the American Jailers Association provide means to reach this market niche through direct mail, journal advertising, and exhibits at national and state conferences. Moreover, these

associations often have special interest groups that focus on technology and/or literacy; these constitute a core network of people upon whom publishers can rely for input on product design, beta testing, and word-of-mouth sales.

ILS vendors with a substantial presence in Federal prisons include CCC and TRO. JLC and Ideal Learning have also made significant penetration in state correctional institutions.

In addition to purchasing ILSs, several correctional institutions have designed local area networks using their own or commercial instructional management systems (e.g., Ideal Learning's management system). Third-party publishers whose products are often used on these networks or on stand-alone work stations include Hartley Courseware, Davidson & Associates, Skills Bank, Educational Activities, and Broderbund, among others.

3. College Remediation and Adult Basic Education

State education policy, which can vary considerably among the states, affects this market niche much more than such policies affect the JTPA or correctional education niches. In many states, colleges play a key role in adult basic education. In Texas, for example, enrolling freshmen must take a test and, if found deficient, have the deficiencies remediated prior to receiving college credits. In other states, different state institutions are responsible for adult basic education and literacy training. Recession-induced reductions in state funding for two-year colleges over the last year have constrained remedial programs despite increases in two-year college enrollments and the need for remediation. Although there are incentives for participants in remedial programs and for adults in literacy training (e.g., through the JOBS program), college faculty have little incentive to instruct remedial or literacy courses. In many instances, this situation has created opportunities for technology-based instruction which can be implemented in a non-traditional college classroom environment. More than other service providers, community colleges in most states receive funding from a wide range of Federal, state, and corporate sources, a factor which contributes to the variety of program configurations in colleges.

The major challenges for software publishers in the college remediation and adult basic education niches relate to: (a) identifying key decision makers in these programs; (b) providing programs that meet differing requirements; and (c) offering creative financing arrangements to accommodate different funding sources. Another problem confronting some ILS vendors and publishers who serve as hardware VARs is the confusing nature of major hardware vendors' distribution channels -- some vendors use university channels to reach this market; others rely on government channels; while still others use K-12 distribution groups.

Although such ILS firms as WICAT Systems, Wasatch Education Systems, and others mentioned earlier have penetrated this market, their presence is considerably lower than other software publishers such as Educational Activities, Skills Bank, and Davidson & Associates. Because funding levels are often not sufficient to allow purchase of high-cost ILS programs, in some states college staff have designed their own programs using software from a variety of publishers. In addition, publishers of text and supplemental materials such as Steck-Vaughn, Cambridge, and Scott, Foresman sell products to this market niche, relying on their existing sales channels to university markets.

III. CASE STUDIES

Many of the insights expressed throughout this report are based upon the team's general awareness of the market for technology products in literacy programs. This awareness has been augmented by a series of corporate studies. Specifically, this chapter includes case studies of software and other publishers who have entered the literacy market with technology-based products. Also included are several case studies of publishers who are in the literacy market but only in a peripheral way and several successful software publishers who have consciously decided not to enter this marketplace.

This chapter is comprised of: (a) a brief description of the sample of case study firms; (b) comprehensive case study summaries; and (c) an analysis of patterns among the case study participants.

A. CASE STUDY COMPANIES

One of the overall purposes of the case studies was to identify patterns or characteristics of firms and products that have successfully entered adult literacy niches and to obtain the perceptions of corporate officials regarding Federal and other intervention strategies which would make the adult literacy marketplace more viable for them.

The firms were selected purposively in order to include representation from different types of publishers and vendors. Of the five case study firms that have entered the marketplace, three are successful ILS vendors with products specifically designed for literacy niches; another is an software publisher who has experienced growth in both consumer education and institutional education markets prior to recently announcing its adult literacy products; and the other publisher markets primarily to institutional education providers, but is currently expanding its marketing to the corporate and personalized literacy markets.

One of the two firms on the periphery of the literacy market is a very successful, large publisher of primarily consumer entertainment products, which increasingly are being used in school and other education environments. The other is a traditional textbook publisher who entered the literacy market

over ten years ago with text and related print materials and, as a result of several acquisitions, is currently phasing out of the literacy market generally.

The remaining two firms were selected because of their success in the education software market generally; however, both made conscious decisions not to enter the literacy market.

Exhibit 15 presents summary characteristics about the seven companies that sell technology in the literacy marketplace.

Exhibit 15

CASE STUDY PROFILES

Company	Types of Products	Involved in Literacy Since	Primary Niches Targeted	Total Annual Sales (avg)	Sales Breakdown		Software Development	Formats
					Home/Business	Education		
A	software/ multimedia	1991	ESL corrections community colleges	$15-20M	65%	35%	in-house	software CD-ROM videodisc
B	ILS	~1980	community colleg corrections corporate literacy JTPA	$30-40M	60%	40%	in-house	software (ILS) telecommunicatio
C	software	~1989	corporate literacy community colleges JTPA corrections	$2-4M	10%	90%	in-house	software
D	software/ ILS	~1989	JTPA community colleges corrections	$100-120M	10%	90%	in-house	software (ILS) CD-ROM
E	ILS	1990	corrections community colleges JTPA	$10-12M	20%	80%	in-house/ contract	software (ILS)
F	entertainment software	N/A	consumer/ K-12	$40-60M	80%	20%	in-house/ contract	CD-ROM software
G	textbooks/ software	1979	ABE	$1,200M	82%	18%~	in-house/ contract	print software videodisc

B. CASE STUDY SUMMARIES

Below, we present narrative descriptions for each of the nine case study participants. Each case study addresses the firm's background, the basis for its entry into the literacy market, and its perception of important trends in the market.

1. Company A

Company A is a successful software publisher with products for both the home and institutional education markets; it entered the adult literacy market in 1991 with three modular multimedia software products.

a. Background

Founded over a decade ago by a former teacher and her husband who had business experience, Company A has grown steadily, to average sales of approximately $18 million over the last three years. Approximately 65 percent of its software sales are in the consumer/home market, with 35 percent in the institutional education market. About 60 percent of its 30 or so software products are designed for the K-6 school market, with 25 percent targeted on grades six through 12. Approximately 15 percent of its product offerings have been specifically designed for the adult literacy market niches. The company is privately owned with few outside investors. Virtually all of its multimillion dollar development efforts have been funded internally through retained earnings.

The company's product line is predominantly computer-based instruction. One of its newest products is available on computer-based, CD-ROM, and videodisc formats. Most of the current product line executes on most Apple, as well as MS-DOS, platforms.

The founders' education philosophies and commitments to education continue to permeate the company's business strategy and operations. Virtually all of its products are designed to provide instruction for students, while accommodating the needs and desires of teachers. The company has used profits from consumer home sales to develop institutional education products including its literacy line. The company historically develops products for platforms which take advantage of technology advances and expanded functionality, rather than waiting for an installed base to reach a critical mass in the school market; it also provides new versions of existing programs in the form of upgrades which also take advantage of technology advances.

b. Entry into the Literacy Market

The firm entered the literacy market in 1991 with a comprehensive English as a second language (ESL) product which is now available in computer-based, CD-ROM, and videodisc formats. This product is targeted for limited English proficient (LEP) individuals beginning at grades five through adult. The firm subsequently released two additional programs designed specifically for adult literacy and at-risk youth.

In 1989, the firm began to compile and analyze market research on literacy/ESL markets. The founders of the company and its Director of Education Marketing were directly involved in assessing the market and, early in 1990, made a conscious decision to invest heavily in product development. The major reasons included:

- the significant increase in Federal and state funds for adult literacy and ESL programs (particularly in certain states);
- the lack of any technology-based ESL/literacy products in the marketplace according to its customer base, which increasingly requested such programs and encouraged the company to develop them; and
- a perceived opportunity to demonstrate that a multimedia product could meet the dual needs of LEP and low-level functioning individuals.

The primary information sources used to conduct market research included:

- focus groups, with superintendents, ESL program directors, and teachers, which addressed perceived needs;
- information compiled and provided by a market research firm, related to state funding and trends, as well as opportunities for funding under multiple Federal programs; and
- advice and consultation with experts from the ESL program user community, national literacy experts, particularly those associated with the Adult Literacy and Technology "network", and individuals knowledgeable about niche markets (particularly correctional education).

The firm targeted different configurations of its multimedia programs at different niche markets. For example, with certain secondary ESL programs, it promoted the videodisc format, which could be used by an individual teacher as

a presentation and instructional tool for small groups or classes of learners. Later these videodisc users could add on computer-based programs for individualized supplemental instruction. For the correctional education niche, the company proposed the computer-based and CD-ROM network versions, under the assumption that student-directed, individualized programs would be more desirable for accommodating specific needs in such institutional programs, especially where teacher shortages exist. For the community college remediation market, the proposed solution was primarily a computer-based format which allowed for individualized, open-entry/exit study.

The company's business strategy to penetrate the adult literacy/ESL market required several changes to its organization, sales, and promotion approaches. The company created separate profit centers for school, consumer, and affiliate label markets. Approximately half of the staff assigned to the education division focused on the ESL/literacy markets. While the development group remained intact and expanded, individuals with technical expertise directly related to the development of the literacy products were assigned to such development; in some cases, individuals outside the firm were hired to work on literacy product design.

While the firm's K-12 products continue to be marketed primarily through national distributors, the education division has created a direct marketing capability by hiring three national sales representatives who focus solely on literacy market niches. In addition, the company has negotiated arrangements with five of its education dealers who also market the literacy products. The firm has also entered into an arrangement with a large integrated learning system (ILS) vendor to market the CD-ROM network version of the ESL product on a non-exclusive basis. The company has business partnerships with three major hardware vendors, all of whom support some or all of the ESL/literacy programs on their platform.

Because of the projected cost of developing the ESL/literacy product, the company invested heavily in staff time, consultants, and focus groups to identify design features which would increase its sales potential in the various literacy niches. It polled attendees at various market niche conferences (e.g., NABE, TESOL, ALT), hired practitioners as consultants in this market, and reviewed research findings relevant to programs and features which appeared to be effective in adult correctional education and ESL/

bilingual environments. In these areas, as well as other market niches, the existing research base was found to be meager. Information from various respondents led the company to one general formatting approach -- teach with a videodisc, follow-up with computer-based instruction, use print materials for reinforcement, and position the product as a tool that can be used by teachers, other staff, and even participants. This "natural approach" followed closely a general methodology for literacy developed by a well-known researcher, whose findings were used to "flesh out" the overall design configuration. Once the design was configured, the capabilities of multimedia components (e.g., digitized speech) were confirmed and the configuration was broken into modules which could meet different program and user needs (e.g., one of the strands on the CD-ROM is designed for junior and senior high level students, while another strand of visual displays is designed for adults). The modular nature of the system could enhance its sales potential because users could purchase priority components first and add on components later when funds became available. Indeed, according to company officials, "most of its current user base believes that the product's strength is that it fits easily into existing teacher modes and is not an imposition".

During the product's design and beta testing phases, several changes were made, including: (a) redesign of bar-code lessons; (b) development of a teacher control panel to allow easier prescriptions for students; and (c) provision of print materials on higher grade stock to minimize damage through use.

Most of the problems encountered during the design/development phase related to the "newness of the product and emerging multimedia components". For example, the significant increase in the numbers of cards for digitized speech required extensive study and time in selecting the most appropriate ones for producing compatible versions. Another time-consuming activity was ensuring that design features of the ESL literacy program would, indeed, complement the ILS offering of a vendor who marketed the CD-ROM network version.

Pricing decisions took into account several factors, including: (a) the cost of development; (b) the price of competitive products with critical features; and (c) comments from focus group sessions which indicated that the total system should cost less than $10,000. Subsequent pricing arrangements

have reflected significant flexibility in pricing, ranging from stand-alone, computer-based versions to a complete system configuration. Such pricing was relatively new to Company A because most of its existing product line has been sold for stand-alone and network versions only, using traditional discount features or licenses. The company has used a variety of financial incentives to both dealers and sales representatives, which have resulted in increased sales.

The ESL/literacy program was announced approximately six months prior to product availability -- at a national software publishers' trade show. The company also promoted the product with full-page advertising in general education technology magazines and exhibited at most of the market niche conferences for the first time. Press releases, news items, and some advertising were also placed in the official publications and journals of associations representing users of these niche markets.

Because of its direct marketing sales strategy for its literacy products, the company has had to allocate a significant increase in staff time for initial installation and follow-up support. This is particularly true for the network versions of the product, which has resulted in a slight increase over the initial price offering.

c. Future Viability of the Literacy Market

Officials of Company A feel the need for literacy training will continue to grow during the decade. However, the viability of the marketplace will largely be determined by the availability of "increased funding for service providers to purchase their products". If demand increases, they see prices dropping as unit costs of production decrease and as more competitors enter the literacy market, particularly the ESL market. These officials believe that advances in sound and graphics will require upgrades every one to three years and that they will continue to develop for high-end multimedia platforms. Increasing purchases of CD-ROM technology and programs in the K-12 market should drive down prices for programs designed for this technology faster than will similar increases in the use of network configurations.

Company officials also believe the Federal government should play a greater role in providing funding for service providers; as such funds

increase (e.g., as in Chapter 1 over the last three years), the firm will be able to finance private software development through its retained earnings. They also believe that the Federal government has a critical role in establishing priorities related to increasing awareness of the need for literacy training and establishment of such standards as the SCANS committee recommendations.

2. Company B

An acknowledged leader in providing technology-based products for the literacy market, Company B acquired the rights to a well-known integrated learning system (ILS), which has been used in literacy and training programs for more than a decade. Company B has clearly targeted each of the literacy market niches with the well-known ILS offering supplemented by some third-party products.

a. Background

The company was formed in 1989 through the acquisition of a software division of a major computer firm; investments were made by Company B and their venture capital partners. The acquired division of the computer company had a long tradition of marketing a well-known ILS package which had been developed and enhanced over two decades. Initial development funding came from several Federal agencies, including the National Science Foundation in the 1970s; subsequent investments in product development and improvement came from the computer company. The computer company retains 20 percent interest in Company B, and many key staff remained when Company B was formed. This has resulted in Company B's staff having extensive experience in developing and selling technology-based products to various literacy market niches. Most of the corporate officials of the new company, however, came from a major provider of education and training services for the corporate sector, whose former president became the Chief Executive Officer of Company B.

Building upon the philosophy of the corporate officials who acquired the company, Company B's objective was to become a solution-oriented, client-driven organization using technology. Since its creation, the company has increasingly provided technology integration services as the basis of developing comprehensive education solutions for its clients.

Having about eight regional domestic offices and four international offices, Company B employs approximately 200 people. The company has three divisions. The first and largest is the Education Services Division, which has primary responsibility for for education and literacy marketing, described below. The second division markets professional testing and certification services for associations and government agencies. This division is responsible for a variety of services ranging from the development of individualized tests from its massive on-line testing data base to administration of its professional testing and certification service in such areas as securities, insurance, and aviation. The third division provides technology-based training products for the aviation industry. One common thread running through all three divisions is that virtually all services have been built acquired curriculum management and other software, which includes modular curricula, individualized testing, and curriculum management capabilities.

The company's product mix includes more than 2,000 modules which, in many cases, are custom designed for the needs of particular clients. The majority of these products are computer-based courseware, although the firm does supplement existing products with third-party products in a variety of formats. The "customized" solutions include adult basic skills, high school basic skills, GED preparation, enrichment and higher-lever skills for advanced placement curriculum, and foreign language/ESL programs. While the firm has provided solutions for Chapter 1 programs, it is generally considered a leader in correctional education, JTPA/JOBS service providers (particularly community-based organizations), and corporate literacy.

The firm's major product has a long history of continued quality improvement through revisions based upon customer feedback and upgrades to take advantage of technology advances. The firm conducts an annual survey of its customer base, many of which have been operational for more than a decade. It also conducts surveys of sales staff to identify improvement needs. Unique to this firm is a Vice President for Quality Assurance who oversees its assessment and evaluation (both formative and summative) and alpha and beta testing.

b. Entry into the Literacy Market

Company B entered the literacy market through its acquisition of the computer company division, which had an existing ILS product serving various niches. The principals who formed the company and assumed major corporate responsibilities came from an education and training provider for corporate markets. The major reasons for "entering" the literacy market included:

- a growing awareness of the need for retraining between half and two-thirds of the work force over the next decade;
- increased publicity in the national media about literacy and increased Federal attention to the literacy problem;
- the availability of a modular ILS product, initially developed for the general literacy market, which offered opportunities for expansion in existing and new markets; and
- the commitment of the company founders to solving literacy problems through the effective and appropriate use of technology-based solutions.

Because of the background of company officials and long history of marketing literacy products and providing literacy services, the company has relied on a variety of information sources, not only in its decision to enter the market but, more critically, to develop plans for penetrating market niches. Individuals within the marketing group collected and analyzed literacy-related publications from the Departments of Labor and Education, particularly such programs as JTPA, Chapter 1, adult literacy, and vocational education. The Literacy Clearinghouse within the Department of Education was viewed as a particularly good source for useful summaries and relevant publications. The firm also subscribed to a number of services and newsletters which focused on the literacy market. These included TechMIS, a Report on Literacy Programs, and such journals as Educational Technology. Several associations (e.g., the Correctional Education Association, National Alliance of Business) also provided useful information through their publications. However, "the most critical information source for planning the timing of product development is the annual survey of their installed customer base".

As noted earlier, the firm's major product is a library of modules, which are part of the company's acquired ILS, as supplemented by third-party

products, primarily in a computer-based instructional format. The primary solutions sold to the different markets include:

- JTPA/JOBS: remediation, job preparation, and GED preparation;
- correctional education: GED preparation, basic skills, and ESL;
- community colleges: remedial basic skills, advanced literacy skills, and ESL; and
- Chapter 1: basic skills and advanced reasoning skills.

The company has also developed partnerships with other companies whose products it frequently markets, particularly in the ESL area. A business partner with both Tandy and the IBM Corporation, it resells some third-party software products and has "private-labelled" other products as they have become integrated into their solutions (e.g., ESL).

The company's business strategy for expanding into the various literacy market niches generally included the following facets:

- build upon the company's modular ILS product, customizing it to meet the particular needs of market niches;
- build upon the acquired division's customer base and track record, wherever possible;
- bundle third-party products with the company's products, facilitated by an enhanced curriculum management system;
- correlate the company's products to instruments used extensively in different literacy market niches; and
- maintain quality assurance over its products through customer surveys, continual review of potential third-party software, and revisions/upgrades of existing products.

The firm's core program has, of course, existed for a long time. A number of participants have been instrumental in determining the need for enhancement, upgrades, and bundling of complementary third-party publishers' materials. These include the Director of Product Development, the Director of Education Marketing, the sales force (which provides both formal and informal feedback), and experts who are used as advisors by the company. These experts are usually researchers and/or practitioners in the work place literacy, correctional education, and JTPA markets.

In seeking third-party software and/or identifying the need for enhancements and upgrades, the key decision makers follow a number of design principles which include:

- The program should have the functionality and capability for assessing individuals across all niche areas and at varying entry levels; under this principle, a large enhancement was recently developed for the JTPA service provider niche.
- Sales and support staff should have the ability to customize modules for specific market needs or to provide authoring capabilities for clients to make minor modifications.
- The development and expansion of competencies across all modules should be aligned with mandated standards, objectives, etc., which exist in the various market niches.
- To ensure high degrees of relevance, there should be a general thrust toward expanding modules and/or competencies which are directly related to the work place.
- There is a need to provide limited customization for specific clients without developing costly, fully customized solutions.

Company officials also feel strongly about a number of design features which they feel have become indicants of quality as perceived by their customers. These include:

- an outcome-focused product which relies heavily on easy-to-measure competencies;
- efficiency of instruction with sophisticated branching to ensure that students achieve predetermined performance levels;
- an open entry/exit system that can be operated with minimal instructor dependence;
- a program which has been designed specifically for young and older adults; and
- "personalization" of literacy products through the use of established competencies and individualized, participant-directed programs, etc. (Officials feel strongly that use of supplemental materials in adult literacy programs will turn off participants; remote dial-in for use of lap-top and other computers is, however, appropriate.)

Conducted by the Vice President of Quality Assurance, most research and evaluation related to the program and its components focus on content and

instructional effectiveness (e.g., learner mastery of skills and performance improvement, production values). Expected production values are obtained through interviews, competitive analyses, marketing, and sales.

During the program enhancement process, some of the more important barriers encountered have included:

- difficulties in fitting the program's modules into specific curriculum areas currently used by customers; and
- deciding on the degree of customization for work place literacy market niches (e.g., by directory of occupational title, firm, or other criteria).

The company and its predecessor have used a variety of pricing arrangements to sell the program. The predecessor once sold the program to JTPA service providers under a pricing arrangement whereby the firm shared risks with the service provider, ensuring that the appropriate number of participants would achieve minimum performance levels. Currently, the pricing arrangement used by Company B is characterized by both customers and company officials as being "flexible to accommodate the needs of the customer within general cost parameters". For example, the company will license the program, on a work station basis, for corporate literacy environments; in some school situations, it has provided school-based license arrangements for multiple work stations in classrooms. Another reason why flexibility is required in negotiating with potential customers is that business arrangements with hardware vendors for which a company serves as a VAR often change.

Well over 90 percent of all of Company B's ILS sales are through its direct sales force. In addition to knowing the product, these experienced sales staff:

- are aware of the options for customizing program modules for specific clients;
- can anticipate accurately the amount of follow-up support being included in negotiated maintenance fees; and
- are able to assess accurately the customer's short- and long-term needs, although the customer may not be aware of them at purchase time.

It is clear that Company B's success can be attributed, to a large extent, to the quality and experience of its direct sales force.

In addition to negotiated customer incentives, the company uses general marketing incentives with its literacy program, including:

- special offers (e.g., introduction of a CD-ROM-based program);
- special incentives to existing customers to upgrade modules; and
- special promotion through direct mail.

The company's success in penetrating virtually all of the literacy market niches can be attributed to the quality of the program, an experienced sales force, and innovative promotion. For example, rather than full-page advertisements in journals, the company encourages customers (with evaluation and research support from the firm) to write articles on the program or specific modules, indicating their success with different populations and in different program configurations. Advertising is usually scheduled in coordination with such articles. Company B also relies on trade shows, with follow-up direct mail and sales calls to qualified customers.

The company has had its "greatest difficulty in reaching potential customers in the work place literacy market". Carefully placed articles and advertisements in publications from associations such as National Alliance for Business and ASTD generate some leads. However, the company, along with others, has had difficulty identifying appropriate decision makers with funding. In many cases, the company believes "it is more cost-effective to approach individual plant managers and/or unions than corporate personnel directors".

c. Literacy Trends

According to company officials, two major trends will continue to converge over the next few years. One is the need to tie products and programs more directly to the work place in terms of terminology, occupational clusters, etc. This will be particularly true in the JTPA and community college literacy areas. A second major trend will be "an increased demand for

performance-based products, possibly with some guarantee of achieved performance levels".

In terms of product formats, the market is increasingly demanding multimedia and modular programs. Three important factors have contributed to this: (a) pressures to make instruction relevant to the work place; (b) the need for increased customization of content; and (c) the increasing number of limited English proficient adults who are enrolled in literacy programs.

Company B officials suggest that a number of Federal roles and strategies would increase the viability of the literacy marketplace, and perhaps increase the effective and appropriate use of technology in these programs.

One immediate strategy would be to provide tax incentives for employers who provide work place literacy programs. This would assist enormously in addressing the number one problem in the marketplace -- availability of funding.

These same officials also suggested that legislation or regulations which provide incentives for service providers "to serve those most in need" would expand the number of literacy programs in a relatively short time period. With the current high rates of unemployment in certain states, many JTPA-sponsored literacy programs have shrunk dramatically, because the primary focus within JTPA has become job matching, usually of individuals who do not require literacy training.

An important Federal role in facilitating the use of technology might be "the establishment of standards" such as those recommended in the SCANS report. Company officials believe that such standards should be competency-based and not tied to norm-referenced tests or grade levels. They also indicated that state initiatives to establish standards (e.g., the Texas Assessment of Academic Skills (TAAS) standards for enrolling college freshmen) would be extremely beneficial.

Company B believes that increased Federal funding for product development (from NSF, for example) would not be as effective as other strategies that address market demand. They believe that funding agencies have review

policies which are biased against private firms, which require extraordinary red tape, and which are generally more bureaucratic than market-driven.

3. Company C

Building on one basic product line, Company C has experienced rapid and steady growth over the last five years, first in institutional remediation markets and now in most adult literacy market segments. Their product line was designed and developed by company principals who have extensive research backgrounds and experience in special education and remediation. The company is an industry leader in providing comprehensive, flexible, and inexpensive software products for improving basic skills performance.

a. Background

When Company C was created during the mid-1980s, its goal was to become the "Crayola" of the education software field -- an inexpensive solution found in every home, school, or other setting where learning is promoted.

Its initial product line was developed primarily for at-risk populations in traditional school environments, as well as for the development of basic skills. One of the principals of the firm designed the program, while another principal, a well-known microcomputer business/graphics software developer, developed the program with funding from a hardware vendor. As the company entered the literacy market, it developed, and is still developing, products for the business and home markets as special editions, incorporating enhancements and modifications to its basic product.

In addition to developing and publishing its basic product line, the firm has also developed a program that can be used for diagnosis/remediation and career assessment in job training markets such as JTPA and JOBS. This product, marketed by a national dealer, is one of the most widely used of its kind, particularly in the JTPA system.

Company C is privately owned, with principals owning 65 percent of outstanding shares and approximately 50 investors owning the rest.

The company has 45 employees, located in two geographical areas. The firm's operations group handles customer service, technical support, manufacturing, and shipping; the finance group handles accounting, planning, and credit. The development group is responsible for new product development, product enhancement, and demonstration disc; the marketing group directs all advertising, direct mail, and public relations; and the sales group handles dealer recruitment, training, channel support, telemarketing, and channel training.

Since its establishment, the firm's growth rate has exceeded 40 percent annually, with three-year average sales of approximately $2.5 million, most of which are discounted sales to dealers. In the most recent year, most sales were in the education markets, with less than ten percent, collectively, in the business and home markets.

The firm's product mix includes: (a) the basic program, the institutional version of which has been purchased by Chapter 1, special education, vocational education, dropout prevention, corrections, JTPA, library literacy, and other niches; and (b) special editions, currently being developed, which are planned for home and corporate literacy settings. All of the company's current products will continue in computer-based formats. The firm acknowledges that it "is not a leader in the technology arena" and has developed programs, updates, and new versions only after the installed base of specific platforms reaches a level that will ensure a quick return on investment. The firm plans a seven-year cycle for most of its products, which allows it to spend a great deal of money on development and to develop a long-term relationship with specific market niches.

Because the company controls its own manufacturing, major updates are issued every two or three years, or when a customer or dealer requests specific changes.

The firm is not greatly concerned with state-of-the-art technology advances because its products require little memory or peripheral devices. On the other hand, its products are well-designed for the installed base, whether in institutional education environments or other settings.

b. Entry into the Literacy Market

The company's entry into the literacy market was evolutionary rather than the result of a specific decision. As the company's program began to sell in the institutional K-12 market, requests for information and sales from many literacy niches began increasing. Over the last three years, the company has made a conscious decision to intensify efforts in the various literacy markets. Several factors contributed to this decision, including:

- the match between the company's expertise in basic skills and literacy programs;
- the availability of "mail houses" and associations who could provide contacts for direct mail and telemarketing to institutional providers of literacy programs (e.g., community colleges, correctional associations); and
- the high visibility of the literacy issue, an indication to the company that it would not have to sell the fact that a problem exists.

The company's principal sources of information were: (a) its customer base; (b) market research firms specializing in literacy niche markets (which provided useful information about state initiatives and funding, as well as Federal policies and regulations); and (c) association journals, reports, and mail lists. Another useful source of information, which confirmed the firm's rationale for entry into the market, was the evolving base of research on effective practices and literacy training. This research tended to support the pedagogy and content of the company's basic skills programs, indicating that what had worked for at-risk adolescents was likely to work with illiterate adult populations.

The firm's initial product was designed for "the kind of small group, lock step, supplemental instruction particularly prevalent in remedial and Chapter 1 programs". The product also worked well in community college remediation programs and with voluntary groups. For other types of service providers -- such as JTPA, correctional education, and work place literacy -- the program had to be repackaged slightly, adding such features as open entry/exit configurations.

The company's literacy products fit into its overall organizational structure because both institutional sales (which rely on telemarketing, direct mail, and dealers) and other channels used primarily in noninstitutional literacy markets (such as partnerships with other firms) fall under the company's Vice President of Sales. For the most part, the development group, responsible initially for institutional products, developed the firm's literacy products. Although funding for development of its first version of the product resulted from a contract with a major hardware company who opted not to market the product, Company C has developed "few special relationships with external business partners -- either marketing or development". While another hardware vendor markets the initial program to institutional and literacy market niches, this is done on an informal basis, primarily to sell hardware. The company has been offered opportunities to work with hardware vendors in a more formal manner but has turned down such offers.

The company's overall strategy for penetrating literacy markets is basically to:

- segment the various markets, while defining them broadly (recognizing that duplication of funding may occur);
- identify institutions, associations, and other groups that can help make products visible and provide specific service provider information through mail lists; and
- provide general advertising and foster word-of-mouth promotion for segments difficult to reach through other approaches.

Underlying this strategy are other critical principles:

- price the product below competitors' prices;
- keep overhead costs low; and
- carefully track promotional advertising, sales leads, and sales and drop approaches that do not work.

The company's three principals decided what products to develop and enhance and how to package them for literacy markets. All agreed that "products must be pedagogically sound, have appropriate content based on empirical research, and be designed to execute on the installed base". In designing or enhancing existing products, the principals relied on a number of

sources, including market research/evaluation mail lists, surveys, periodical reports on the installed base, review of professional literature, and discussions with professionals on hot approaches (e.g., whole language approach). Information provided by its existing customer base, usually through discussions between staff and customers during technical assistance requests on their toll-free telephone line, also provided useful insights to the program development staff.

The most critical design features incorporated into the literacy products include:

- The program should easily and quickly diagnose weaknesses and address them on an individual basis.
- The program should be capable of being operated without supervision and should easily accommodate "personalized" literacy training in different environments.
- The program should provide constructive feedback and reporting to the learner, not only to ensure privacy and dignity, but also to accommodate union and employer rules regarding privacy.
- The program should easily accommodate the environment in which programs operate.
- The products should be cost-effective with prices significantly lower than those of their competitors.

In the corporate literacy market, "several employers have indicated that the firm's program is effective in providing personalized literacy to managers, supervisors, and lower level staff by helping remediate literacy deficiencies".

The major influence on the design process was the more than 50 years of research experience in special education and instructional design of the firm's three principals. One of the principals had directed research on learning efforts for almost 15 years in several Federal agencies. Instructional strategies for the programs corresponded to many of those used in special education (e.g., diagnosis, prescription, small steps, positive response), reflecting the background and experience of two principals. The third principal was a recognized software design expert who developed one of the most widely used computer graphics applications in the United States. In developing the content of the program, the principals analyzed common domains

in the most widely used norm-referenced test to determine content for the programs.

One of the major barriers in the initial development process was getting appropriate feedback from groups of practitioners and researchers in the various literacy niches. "Unlike the special education community, which is organized to provide professional feedback to developers and publishers, no such organizational structure, either formal or informal, is available to the developers for literacy products."

The company's initial approach to pricing was straightforward -- namely, to determine what competitors' prices per disc were and use pricing points 20 to 30 percent below them. Hence, while the price-per-disc for most products in the mid-1980s was $25 to $50, the company's price was $15 per disc. Today, the company's pricing strategy is essentially to find pricing points for different configurations (e.g., stand-alone versus network versus sight licenses) to average a 20 to 25 percent return on investment each year over a planned life cycle of seven to eight years. Market size is defined broadly, so that even with conservative penetration rates, pricing may be kept relatively low.

The institutional, remedial, and literacy niches are marketed through dealers, company-operated telemarketing, direct mail, and some direct sales by corporate sales staff. The firm's new noninstitutional literacy marketing will rely on: (a) third parties with extensive service provider contacts; (b) journals, newsletters, and other communication vehicles which target individuals within specific communities of interest; and (c) government and other literacy clearinghouses that can respond to specific practitioner requests for information about available programs. The company's noninstitutional strategy is to make potential service providers familiar with new product offerings to generate leads which can be followed up by telemarketing or third-party marketers.

For its literacy products, the company has used policies similar to those followed for its institutional K-12 product offerings, such as free demonstration discs, 30-day approval on receipt of purchase orders, large dealer bonuses for sales contest winners, and extended credit terms for dealers who are effective in making large volume sales.

Unlike many other companies, Company C "seldom exhibits at national trade shows or education association conferences". Rather, it relies on dealers to exhibit their products at state and regional education conferences, because these individuals have the best capacity to follow-up on leads. It has also invested heavily in advertising campaigns in national magazines targeting the K-12 market, as well as some specialized niche markets (e.g., correctional education). According to company officials, over the past two years all of the advertising campaigns have at least paid for themselves through increased revenue generation.

One of the unique strengths of the company is its extensive recordkeeping and customer data base. This data base allows entry of leads when demonstration discs are sent and when sales are made by various channels. As part of the firm's dealer arrangement, the customer for each sale is entered into the data base, thus facilitating direct mailings and other direct communications with the customer regarding availability of new disc versions and upgrades. Company officials acknowledge that, although their entry into the corporate work place literacy market is relatively new, "it has been one of the most challenging in terms of identifying decision makers within service provider organizations with funds to purchase their products".

Major support for the company's customers is provided through its toll-free telephone number, which is regarded as critical, not only for providing cost-effective technical support, but also for discussing design features, upgrades, revisions, etc. with customers. Customer support requirements have increased since the company began to address seriously the various literacy market niches beyond the high school at-risk market.

c. Literacy Trends

Company C sees two basic groups of literacy target populations, a factor which will have significant implications for product development. The first group is the large number of 15 to 25 year olds who have received up to seven years of schooling but who have minimum literacy competencies. This group "will require programs which are easy-to-use, effective, low-cost, and can be provided in a personalized situation". The second group is a much smaller group, perhaps ten percent of the total population, usually older (50 to 70

years old) who have had very little schooling and will require heavy treatment to feel any impact. These individuals, however, may be the most motivated in terms of a desire to develop new literacy skills.

Company officials believe that the literacy market will continue to be fragmented, consisting of small service providers with limited funds who are difficult to identify. If service providers could be more easily identified, programs will increasingly be made available and prices will drop. Officials also believe that significantly different pricing will be offered for group-based literacy activities than for individualized, personalized literacy training. One of the major barriers which Federal strategies could successfully address is the creation of effective information clearinghouses for both potential customers (e.g., listings of programs) and publishers/developers (e.g., mail list of service providers). Moreover, these company officials also believe that the Federal government could "do much more to create professional communities of interest within the fragmented literacy field and, thus, facilitate closer relationships with developers/publishers, particularly in design and field-testing". These officials point to successful efforts in these two areas by the U. S. Department of Education in the area of special education.

The major thrust of the Federal strategy should be to: (a) create a viable marketplace by providing information to users and publishers; (b) create an environment which increasingly pinpoints the need for literacy training; and (c) provide funding to service providers to allow a pent-up market demand to be realized. By ensuring viability of the literacy market on the demand side, they feel strongly that private sources can be tapped to provide the necessary funding for product development.

4. Company D

Created in 1989 through the acquisition and merger of three education software publishing/service companies, Company D has become one of the largest education software publishers. Shortly after its creation, it established a separate division responsible for marketing an ILS program designed specifically for literacy market niches.

a. Background

Company D, a subsidiary of a parent company that has been selling products to schools for more than 50 years, consists of: a small, but fast growing, ILS company acquired in 1989; a publisher/education service company with a large customer base developed over a 20-year period, acquired by merger in 1989; and a small, but highly successful, publisher of software products for at-risk youth and special education, which was acquired later.

Through these initial acquisitions and mergers and subsequent internal growth, the company now employs more than 1,500, with major offices in three regions of the country. The firm has two principal divisions: (a) K-12, which develops and markets products to school systems; and (b) Adult Education, which has a separate development staff and sales force that sells to all markets outside of K-12, primarily literacy market niches. Principals of the firm have a history of success in starting new companies, managing rapid growth, and eventually selling or taking the firm public. Since its creation, the company has experienced annual growth of more than 30 percent and projects similar growth over the next few years. Although Company D is a large organization, it has also been on the cutting edge of technology, developing and marketing "first of a kind" products to schools. It is committed to rapid growth through aggressive marketing and development of state-of-the-art instructional systems and anticipates investing more than $100 million in new product development over the next four years.

During the last three years, Company D's sales have averaged $100-120 million, with anticipated revenues this year of $200 million. Last year, approximately 90 percent of its sales were to K-12, with about ten percent to literacy markets. The product mix for the K-12 market consists primarily of math, reading, and writing basic skills programs redesigned and enhanced from products of acquired or merged firms, as well as newly-developed products, including science, ESL, life skills, and other modules to complement the basic skills offerings. The primary product for adult literacy is an integrated learning system relying heavily on a best-selling literacy product developed by one of the acquired firms and its management system, which was expanded and enhanced through significant development efforts.

All of the firm's education products are available in a computer-based format, often supplemented by videodisc, CD-ROM, and supplemental materials which the firm has developed or markets under licenses with third-party publishers. Corporate officials believe that major breakthroughs in performance and reduced costs will occur in digitized, full-motion video, which they plan to combine with traditional computer-assisted instruction delivered over local area networks.

Company officials believe strongly that new products must be developed and brought to market in such a way that the installed base can be upgraded to future products by building upon current investments -- "not by throwing away the old and starting over". In the past, corporate officials had planned on product life cycles of approximately five years, including moderate enhancements. They believe that future life cycles will be significantly shorter. Most products sold by the firm have at least one major update annually; these usually include increased management system functionality, additional lessons, or functional enhancements. The need for updates is determined by customer feedback, market requirements, and advances in technology.

Corporate officials indicate that the company will continue to use state-of-the-art standard technologies as platforms on which its programs will operate, as it has successfully done in the past.

b. Entry into the Literacy Market

After the firm's creation, corporate officials clearly recognized that some of the combined product line was successfully being sold in literacy niches. Moreover, a significant portion of the combined sales force had experience selling to this market. It also became apparent that the firm had no comprehensive, computer-based instructional program specifically designed for illiterate target populations (although one of their subsidiaries did). The firm conducted extensive market research on the potential for such a product in light of:

- the increasing skills gap in the work force;
- demographic changes in the work force based on the report "Work Force 2000" by The Hudson Institute;

- the increased visibility of the literacy issue, particularly at the national level; and

- the potential for using networked, K-12 hardware configurations for literacy programming after normal school hours, funded through a multiplicity of Federal sources.

The firm also compiled and analyzed product requests from its existing customer base and reviewed existing literature. It found that most "adult literacy" software was in fact designed for children and not adults. Through monitoring of periodicals and journals (e.g., ED literacy clearinghouse publications, ASTD journals, Report on Literacy Programs), corporate officials identified positive trends in business, education, and government which addressed literacy issues.

The ILS currently available from the firm includes adult basic education, math, reading, and writing; life and employability skills; early childhood programs for parent-child education; research tools and reference materials; English for speakers of other language strands; and work place basics. These modules are currently sold in the following markets:

- Head Start, Even Start, and family literacy programs;

- community colleges, junior colleges, and technical colleges;

- vocational schools and technical institutes;

- JTPA/JOBS service providers, including both schools and community-based organizations; and

- correctional education programs in prisons, jails, and community-based probation programs.

Created in late 1989, the firm's Adult Education Division had its own development and sales staff, separate from the K-12 Division. However, informal cooperation exists between the divisions, in both marketing and development, to "ensure some degree of synergism in their approach to the overall education marketplace". Since its creation, the firm has had a tradition of "creating healthy competition between acquired firms and between new start companies and the parent company". A major difference between the company's two divisions is that the staff of the Adult Education Division has much more marketing and development experience in literacy than does its counterpart in the K-12 Division; while the size of its staff is much less

than ten percent of the K-12 staff, the Adult Education Division had sales that are more than ten percent of overall corporate sales during 1991.

The Adult Education Division's relations with third-party publishers and other groups -- both formal and informal -- are much more extensive than in the K-12 Division. The instructional program's management system "is specifically structured for inclusion of third-party software". This division also has co-marketing relationships with firms with similar or complementary product offerings.

The business strategy for the division was to develop very high quality products, to package programs to meet the unique needs of the various literacy niches, and to establish partnerships with customers to bring about significant literacy skill improvements with various target populations who have traditionally had limited opportunities.

In deciding to enhance existing products and develop new ones for its ILS, the firm undertook a number of marketing and development steps, including:

- a search of articles and published research about adult learning needs, characteristics, materials available, and skills related to employability;
- surveys and interviews with several hundred practitioners and well-known publishers/researchers in the field of adult literacy, particularly individuals associated with the Adult Literacy Technology (ALT) network and correctional education;
- obtaining corporate approval for assigning individuals outside the division to the development team, particularly those who had extensive research and design backgrounds; and
- hiring additional development staff and consultants with knowledge of adult learner needs, characteristics, and computer-assisted instruction.

It is important to note that key development staff have reputations as excellent researchers on effective learning techniques with adults and individuals with learning disabilities, and in compensatory education. In the development of prior products, these individuals had established a network of alpha and beta test sites and created forums for obtaining input from other researchers, publishers, and practitioners. The development team "was very

critical of existing research, questioning most of its value". The team relied most heavily on their own experience as they developed products, conducting their own analyses of standardized and other tests used with adult populations and reviews of existing products. One of the important capabilities of the new management system was that it allowed the company to "track individual participant growth, results, problems, etc., thus facilitating subsequent research for program improvement".

As a result of these activities, the following design features were identified as being most critical in the final program:

- a capacity to conduct ongoing diagnosis and prescription at the individual skill level;
- inclusion of adult context and graphics;
- the use of practical and relevant applications based on participants' language experiences;
- a capacity to operate in an open entry/exit environment;
- a management system which allows instructor-directed and learner-directed modes;
- a capacity to accommodate the needs of learning disabled and limited English proficient students;
- the integration of vocabulary skills applications, building from the cognitive to the metacognitive level;
- highly interactive features with constructive feedback;
- a comprehensive scope to deal with the "splinter skills and knowledge" of the population;
- a management system that facilitates the use of third-party publishers' software and programs developed by the other division; and
- the capacity to build higher order thinking skills through linkages involving the retrieval and use of information.

The product was released to field-test sites in phases, a process which continued as new features and curricula were added or revised. Officials report that major design changes have not been necessary, but the company has frequently responded to customer requests for more curricula in certain areas, more flexibility through the management system, and more "voiced" content. It

has also provided additional support for integration of the program into clients' operational programs.

One of the major barriers encountered during development was difficulty in conducting field-tests because of the "heterogeneity, diversity, and fluidity of the population involved". The level of entering students at the field-test sites was difficult to predict; and many dropped out of the program overnight.

Another major design problem was to accommodate the diverse needs of the target population; some of the population have learning disabilities and social disturbances while others have limited English proficiency. The solution was to provide a flexible, modular set of curricula that meets all of the target populations' needs but allows for individualized instruction with branching to ensure individuals with different levels proceeded as quickly as possible. The "key to success was the management system".

As noted earlier, another major barrier was the lack of relevant research which focused primarily on effective practices with the target population; most of the research focused on at-risk youth and adults with some basic skills rather than low-functioning adult populations.

The Adult Education Division uses a variety of channels for reaching the different literacy niches. The company's adult education sales force covers major literacy markets (e.g., community college remediation, JTPA, correctional education) as well as smaller markets where the staff has specific expertise and knowledge. It relies on several business partners to reach some of these very specialized markets. For example, it has developed a co-marketing relationship with a firm who markets directly to vocational-technical schools. The division's sales staff also works with the K-12 Division sales force to reach adult education programs operated by local school districts.

The Adult Education Division has a flexible and negotiable pricing policy which generally takes into account:

- the specific needs of the customer and the various market segments;
- the number of curriculum modules purchased;

- the volume of use (usually number of work stations);
- the amount of customization, if any, required;
- the hardware platform used by the customer; and
- the terms and conditions of the specific hardware vendor with whom the company is a business partner.

Several significant changes in the company's business relationships with hardware vendors have occurred over the last three years which have affected product prices.

The Adult Education Division uses a variety of promotional activities, some of which vary by the market segment. Advertising is done selectively in industry and association journals. Telemarketing is used to provide leads to direct sales representatives. One successful promotional activity has been convening of regional conferences to which both potential customers in specific segments and potential funding sources from government and other agencies have been invited; facilitating communications between potential customers and funding sources appears to create momentum for closing sales. This promotional activity is being tracked very carefully in order to evaluate its effectiveness.

Customer support is a hallmark of the company generally and of the Adult Education Division specifically. For each ILS installation, three days of start-up training are provided, usually with an additional ten hours of ongoing systems training. Approximately 50 hours per year are provided for staff development for teachers and instructional managers. The firm also provides training and support for third-party products that it sells to complement its basic program.

Company officials believe that the major difference between the literacy and K-12 education markets is the fragmentation of the literacy market, with small amounts of funding coming from multiple sources; moreover, the available funding from these sources is often uncertain, which affects sales cycles.

c. Literacy Trends

Corporate officials see several changes in the literacy market over the next few years, including:

- an increased need for higher level skills in math, general problem solving, and information processing;
- the need to include content which reflects cultural diversity in the work place and society; and
- the development of skills related to customer service and personal development.

These officials believe that a number of factors will drive the development of new products in the literacy marketplace, including:

- As business takes a lead role in providing work place literacy, it will require products that focus more on functional context than on basic literacy and cultural skills.
- The adoption of standards and/or standardized curricula, competencies, and program evaluation measures at the national level for adult populations could have significant impact.
- The availability of Federal and state funds for specific product development could encourage developers to move in specific directions (e.g., work place literacy).

Corporate officials believe there are a number of areas in which Federal interventions could make a difference and the market more viable.

First and foremost, they are almost unanimous in their opinion "that increased funding for service providers of literacy programs would result in greater privately financed development of software and related products for the marketplace".

While key company officials would be interested in Federal funding support for product development, they believe that a greater impact could be achieved through the "creation of demonstration programs in which (theirs and other) products could be demonstrated and evaluated". The firm is participating in a Federally-funded special education project which is assessing the use of software and assistive technology with limited English proficient adults who also have learning disabilities.

A third area where initiatives are needed is the creation of more partnerships between the public and private sectors -- particularly employers -- similar to successful JTPA programs.

Because of a lack of national information to assist in planning, one of the initial problems the company faced was assessing the viability of the literacy market. Therefore, good information on funding (sources, amounts, cycles) and evaluation criteria should be collected and made available. The information used by the company was provided by a market research firm and gathered by staff from such publications as Employment Weekly, Report on Literacy Programs, and attendance at adult education conferences.

Other efforts to increase the viability of the market would include tax credits to encourage literacy training. An alternative might be using workmen's compensation fees to cover costs of training.

5. Company E

One of the most innovative of ILS vendors, Company E has sold products to literacy providers for the last two years, although most of its products were designed for the institutional K-8 basic skills market. Recently, the firm decided to develop and market its new, yet to be released, computer-based software programs to several national literacy niches.

a. Background

Founded by two educators and one education industry veteran in the mid-1980s, Company E's goal was to become the leader in the education technology industry by focusing on the computer as a curriculum change agent. Initially capitalized by the founders and friends, the firm raised additional funds for product development through an advance contract on future product delivery. With this advance, the company went to the venture capital community and raised additional funds. In subsequent years, the firm had difficulty in raising capital. According to one official, "Being a software company and in the education industry were two contributing factors to the company's inability to raise funds". After a recent reorganization, the firm

has been able to raise additional funds and has become more financially stable.

One unique aspect of the company's initial fund raising was the partnership developed with districts subscribing for product development, an R&D partnership established under tax incentive provisions in the law at that time. Such provisions have since disappeared, as have the development partnerships with subscribing districts.

Currently, the company has several divisions: Sales and Marketing, Operations, Development, and Administration. Almost half of their 100 employees are in the development division. The firm not only develops and markets its own products, but under contract also develops software products which it co-markets with another company. In addition, the firm has contracted with universities and other groups for very specialized development. The firm is planning to create a division for corporate development, which will be responsible for both strategic relationships and the development of training products and service packages designed to reduce the cost of providing teacher training and support to customers. While the firm has developed some strategic partnerships with firms that bring either expertise or money to the partnership, it is likely to enter into future development partnerships and special marketing relationships whereby it licenses the rights to others, including ILS vendors, to market some of its products.

Company E's revenues come primarily from the education market generally, with minimal revenue from business or the home markets. The alternative education revenue channels represent about 20 percent of its sales through license arrangements and from development. Currently, the firm's product mix includes programs and modules for adult education, middle school science, adult life skills, adult reading and writing, elementary reading and writing, and third-party products in mathematics and English as a second language. Recently, it has been demonstrating versions of some of its new multimedia products focusing on literacy, ESL, and other topics.

Virtually all of the company's products are educational software delivered over a local area network, although some stand-alone versions of specific modules are available. In the near future, the firm plans to develop

programs for different formats (e.g., videodisc) to be used for teacher training. In addition, the firm anticipates "incorporating more multimedia components into its existing program, which will be designed to assist teachers in their presentations". Within three to five years, the firm anticipates the availability of most of its products in a multimedia format.

Company officials believe that the life cycle for an ILS program is approximately seven years, with two upgrades annually; they suspect that such enhanced programs could be sold separately at lower pricing points through telemarketing and other means to extend the life cycle even further. In the future, life cycles will likely be five or less years. The firm's principals feel strongly that those ILS firms who "port products to new platforms, rather than replacing them with new designs to take advantage of the functionality of the new platforms, will not provide comprehensive solutions and, over time, will become vulnerable". The company's philosophy is to design new products for state-of-the-art, standard, advanced technology platforms, incorporating such features as Windows, quality graphics, multiple languages, animation, sound, and hooks for multimedia.

Each year the firm releases at least two upgrades for each product, most being corrections. enhancements, or design changes. In most cases, enhancements are an expansion of the product curricula. The company's policy for enhancement and updates is somewhat unique to the industry. Needs for upgrades are determined through mailings and focus group meetings with users as well as input from consultants and sales representatives.

In deciding on platforms, the firm is continually looking for operating systems that are more portable, one of the reasons why it decided on Windows. While videodisc technology is considered to be most appropriate for small group or teacher presentations, full-motion video (which has yet to emerge) will be more appropriate for individual student work stations.

b. Entry into the Literacy Market

According to the CEO, the single-most important reason why the company decided to enter the literacy market was the positive response to the firm's existing K-12 program by users in the California literacy market, particularly the GAIN program. The firm's sales representative began marketing the program

in the State's other literacy niches after great success with the K-12 at-risk market by emphasizing the features of the existing program that "made sense" with adult populations. Recently, the firm decided to reorganize for the purpose of developing and selling products to various literacy niches. In drawing its plan, it relied heavily on two consulting groups, one focusing on literacy niches and the other on product design and packaging.

Most of the company's literacy products focus on adult secondary, with the lowest level at approximately third grade functional literacy. The firm's basic program emphasizes critical thinking and information processing skills and was recently supplemented by a life skills strand, developed specifically to complement other program elements, in the form of a "shell" that allows customized curriculum for very specific literacy niches. Current customization efforts focus on the correctional education and work place literacy markets.

Organizationally, more than half of the company's development efforts focus on literacy products and initiatives. Currently, its literacy products are being marketed by the same direct sales force that markets to the K-8 market, although the firm is pursuing relationships with independent representatives who will be aimed exclusively at adult literacy niches. This effort will be conducted outside of the company framework, but developed by the Vice President of Sales. The firm is also seriously considering the use of telemarketing to reach certain literacy niches, particularly those which are more likely to purchase stand-alone components or smaller configurations of the ILS version. The firm is attempting to develop its literacy products more quickly and bring them to the market earlier than it has in the past with its other products. Indeed, the major thrust of its business strategy in literacy is the use of multiple distribution channels that are significantly different from those used in addressing the K-8 market. Moreover, the firm will also be relying more heavily on its newly created department for corporate development, which will be responsible for developing product specifications based on market demands, competitive analysis, and focus group findings. Currently, the firm relies heavily on feedback from the direct sales force for product enhancements and new product designs.

The company uses a variety of product development strategies, with most being handled by its development staff. Two years ago, it entered into a contract with a publisher of literacy print materials for the development of a

GED preparation program, a large testing firm for a literacy program, and a university for the development of a math program.

While the firm is generally recognized as a leader who includes advanced design features in its programs, the newest design feature in its literacy programs is the "shell" concept. It believes that customization capabilities will allow for inclusion of specific features and functionality directed toward each of the literacy niche markets, a feature which will assist enormously in positioning the differentiated products. This concept can also increase the probability of the use of multiple funding sources for purchases of configurations, particularly the most costly ones. In addition, such customization capabilities will allow clients to focus clearly on the specific tests that are used in the different niches. The GED preparation program is considered a major step in this direction.

The tool focus of the curriculum is the backbone of its program, according to customers and benchmark analyses of various ILS vendors. The tool-focus curriculum is a type of product that adults tend to be eager to use in focused lessons for 10-to-20 minute exposures over a two-to-three hour sitting. This focus also allows adults to have a "sense of accomplishment".

The firm works closely with its sponsors and contractors in the development and field-testing of its products. One of the important field-test foci of the GED preparation program was to have a product that had value independent of the GED test itself. For this reason, the firm selected as a development partner a publisher that had more value educationally than two other potential partners whose focus was narrowly on literacy areas. The life skills program was developed around the requirements in the GAIN program and the CASAS test used in California.

For the K-12 market, the company's ILS offering is priced similarly to most of its competition, although the firm has in the recent past been hesitant to reduce prices in response to competitors' price reductions for specific large bids. As a result of its experience in selling the GED preparation program, the firm's pricing philosophy in the literacy market has been to sell its existing program and new products "in a modular manner, which take into account the small size of literacy programs and the big differences in budgets across niches and locations around the country". Because of the

generally reduced pricing points, the firm is also planning to initiate telemarketing activities.

The firm's promotional activities for literacy niches are currently under development. Generally, the firm has been hesitant to exhibit at large national conferences where a small booth would appear to look "shabby" next to that of a major competitor or hardware vendor. The company relies heavily on meetings with its customer base at national conferences with contact much more person-to-person than some of its competitors.

The most difficult potential customers to reach, according to company officials, "are the non-public school purchasers, generally, and specifically JTPA service providers and corporate literacy decision makers". While correctional education decision makers are relatively easy to contact, the sales cycle is extremely lengthy and costly, often requiring political contacts, which the company "shies away from".

Company officials believe that the literacy market will require less training support than that needed in the K-8 market since much of the instruction is participant-directed, for which the current management system is being rewritten. While training costs will likely be less than in the K-8 market, installation and technical support requirements are likely to be higher in the literacy area. The major problem relates to hardware maintenance. One of the firm's business partners provides consistently good service, but requires installation lead time of two to four months. Another hardware business partner provides excellent installation services, but very erratic support services and provider staff who are not adequately trained in certain functions of widely-used networks.

Company E has identified several differences between the literacy niches and the K-12 market that have influenced program design and marketing efforts, including:

- The literacy market relies more heavily on self-directed instruction and is more test-driven than K-12.
- Customer decision making in literacy markets is generally less bureaucratic, rarely having to involve the equivalent of boards of education as in K-12.

- The sales lead time is generally shorter for literacy than in the schools and politics are generally less important considerations.

c. Literacy Trends

Company officials are assuming that the literacy market will grow rapidly over the next few years. Currently, they see most of the adult literacy market as occurring in three to four states, at least to justify a full-time sales representative. They have analyzed trend information provided by two market research groups and have concluded that the primary markets in the immediate future will be correctional education, community college remediation, and school-based literacy programs. A market that currently exists and will continue to grow is the ESL, bilingual market.

The types of products likely to be in high demand will be ESL programs (perhaps in the not too distant future executing on multimedia platforms) and products that can provide instruction focused on the different test instruments used in the various niches. Another high-demand product feature will be "modular programs that can be customized for individual clients". Prices for such products and components should drop as volume increases. To the extent training requirements after installation are minimal, "out year" maintenance fees should also be generally lower than in the K-12 market.

During the firm's initial involvement in the literacy market and after it decided to take a directed focus on this market, corporate officials have identified a number of barriers, including:

- limited information on specific service providers and decision makers outside of public school providers and how to contact them;
- a lack of information about funding from nontraditional sources for adult literacy purchases on the part of existing customers and qualified prospects (e.g., nine out of ten existing customers do not know if they have access to available funds for literacy programming); and
- the general lack of information on the part of existing public school customers about service providers funded under JTPA and other sources.

Corporate officials believe that one useful Federal role to enhance the viability of the literacy marketplace would be to provide more accurate,

reliable, and targeted information useful to marketing and sales staff. They also believe that the availability of Federal funds for product development would be "very enticing to them because of the high cost of development, although they are unsure about how much flexibility they might have in developing products". For example, they would not be interested in funding sources that would encourage the reformatting or adaptation of existing products for adult populations. Rather, they believe that future adult products will have to be designed specifically for this population, taking into account the functionality offered by new technology advances. While the compilation and dissemination of research findings on design features that work might be helpful, they believe that their new program will successfully capture such information which can be used for formative evaluation and product enhancements. Because the firm is only now seriously entering the literacy marketplace, it believes that any other suggestions about specific Federal interventions would be inappropriate now; it would have a much better sense for assessing such interventions in six months.

6. Company F

Company F was founded more than ten years ago as a family-owned publisher of entertainment software. The company has always enjoyed success in this market and has grown at a steady and rapid pace over the past ten years. For the fiscal year which ended in August 1991, the company reported sales in excess of $50 million, with a net income of $7 million. Before the recent public offering, slightly over 40 percent of the common stock of the company was in the hands of its officers, directors, and affiliates.

a. Background

The company was founded on the principal of supplying moderately priced quality entertainment software to consumers; for the first five years of the firm's existence, entertainment accounted for the bulk of sales. The company was founded with and maintains a commitment to technical quality and high production values. As the low-end consumer market weakened in the mid-1980s, the company turned to the personal productivity market and began developing families of products to achieve sustained consumer appeal. The success of these products in the schools led the company to focus on the development of educational products, but with the consumer market as the primary target.

The company has 270 full-time employees, including 100 in product development, 60 in sales and marketing, 57 in manufacturing and shipping, and 34 in administration and finance. There are three divisions of the company, focusing on entertainment, productivity, and educational products. Entertainment products now account for about 50 percent of all software sales, personal productivity and education for the other 50 percent. Roughly 75 percent of the company's sales come from the consumer market, 20 percent from the education market, and five percent from business and other markets. There are roughly 15 games and 25 productivity/education products in the company's product line. Education products cover the gamut of grade ranges and curriculum areas, with some concentration in middle school science and social studies.

Products are currently confined to a computer software format, but the company is moving rapidly to begin multimedia publishing. CD-ROM will be the preferred multimedia format, since its focus remains on the consumer market. The movement to multimedia and CD-ROM is anticipated over the next three years.

The life cycle issue was a major factor that moved the company away from its original entertainment orientation. The life cycle of an entertainment product is between six months and one year. Some classic games continue to sell, but the retail market is driven by the need to keep putting new products on the shelf. In contrast, an institutional education program life cycle is considerably longer -- from five to seven years. It takes from one to two years to get a product established in this market, however. This is one reason for developing families of related products, which allow subsequent titles to ride on the acceptance of the earlier product. The life cycle of an education or low-end productivity product in the consumer market is longer than that of entertainment product -- about three years.

In general, only productivity titles are updated, roughly every three to four years. In the education product line, it is more typical to add a new title to an established series. Both updates and new product development are driven by the technology cycle. Some products are, in effect, updated when they are moved to a new machine platform. This is seen within the company as

merely taking full advantage of the features each new hardware platform offers, but it can result in significant changes to a given title.

Since the company sees itself as a consumer market company, keeping abreast of the technology cycle is central. New platforms offer the potential of new customers. Further, there is the advantage of being first to the market with products for new platforms, which is an essential competitive edge in an increasingly competitive marketplace. Company F has a large internal development team; this type of employee always pushes a company to be on the leading edge of a technology -- a method of maintaining their interest and creativity.

It is important to note that this company does not develop products for the school market. "We target parents and children who will be using our products at home; we always have. But we discovered that teachers and schools liked our products." Company F sees its consumer market focus as a real strength. Given the much larger size of the consumer market, the company can afford to invest substantial dollars in product development. This allows it to market products with high production values and "pizzazz" which it believes companies that focus solely on the school market cannot afford to develop. Given the consumer market orientation, the company's products must be fun to use and developed with an eye to replayability and complexity. "In the consumer market, smaller, less ambitious programs just don't cut it."

b. The Literacy Market

Company F admits to a lack of in-depth knowledge about the literacy marketplace. It perceives the market as more fragmented and niche-oriented that the general education marketplace. As such, it has more specific instructional needs than the broader education market.

On the other hand, Company F recognizes that originally it did not see the schools as one of its markets. It was only once the schools began to purchase its products in large quantities, that the company began to target the school market. Since Company F's products are fairly open-ended, with an emphasis on problem solving, they believe they can be adapted for use in many settings. For example, a Company F product is used in special education

classes, although it is not designed for that use. Creative teachers take the product and make necessary adjustments for that environment.

Company F does not consider itself a player in the literacy market. However, it admits that at some point in the future it might turn its attention to that market. The company is unlikely to develop products specifically for this market, but might direct some marketing efforts in that direction, especially the institutional adult literacy market.

The company has not conducted a formal evaluation of the literacy marketplace or made an official decision not to be a player. Instead, it is more a matter of this market being fairly far afield for a company that defines itself as developing engaging products for use in the home environment. However, given the nature of the products developed for the home market -- high-interest, low-threat, highly interactive -- the company does recognize some of the synergies that exist. If convinced that the opportunity costs would not be too high, the company might consider some marketing effort in this arena, especially if it is reachable by direct methods.

Company F's greatest need is better information about the literacy marketplace. Specifically, statistical information about the nature of the participants, types of programs, funding levels, growth rates, etc. Of particular importance would be information about the level and nature of technology use in the literacy marketplace.

In terms of government effort, Company F feels strongly that the government should fund the market sufficiently to help make it an attractive market. The company would never develop products with government money and does not see the funding of product development as an effective intervention strategy. Information gathering and dissemination would also be a highly appropriate Federal role. Some brokering might be appropriate -- an effort to identify and bring together the significant literacy decision makers and make them known to this company and others like it that are not traditional school market publishers.

7. Company G

Company G is an established educational textbook publisher that has functioned as a stable firm for 90 years. It was taken private in the early 1980s. The 1986 tax law revision caused the holding company to be dissolved and the company has since undergone two acquisitions. It now seems to have found a comfortable home and is part of a major international publishing operation with 1991 sales of $1.2 billion. Company G itself had school revenues of $220 million during 1991

a. Background

The company's products are largely confined to print-based textbook products, within the Elementary and Secondary Divisions. The company has a range of computer software products, but software is a secondary emphasis. It is largely viewed as ancillary to the textbook offerings and is not a focus of product development activity. The company is carefully monitoring the movement to multimedia formats and will be producing some videodisc products over the next several years. Development for other formats will be considered as necessary.

The textbook market is driven by the adoption cycle, resulting in a life cycle for a textbook series of between five and seven years.

Since its only market is schools, Company G can manage quite well by keying its technology products to the existing installed base. Although it stays aware of developments, it does not feel compelled to be a market leader with technology products. The company is likely to be more aggressive with multimedia products than it has been with software.

b. The Literacy Market

Company G's involvement in the literacy market has been complex. In 1979, spurred by a vision of developing materials that could take an individual from the cradle to the grave, the company established a Lifelong Learning Division (LLD). The division's mandate was to explore opportunities in any areas not already addressed by the company. The division engaged in two major thrusts -- Adult basic education (ABE) publishing and a joint venture with a large

national association representing older Americans. This latter effort was not a literacy project as such, focused as it was on the joint publication of "how to" trade books aimed at senior citizens. The LLD achieved considerable success as the publisher of ABE materials -- pre-GED, GED Preparation, and some ESL books. In late 1986, Company G was sold to a major publishing firm who saw it as an entree to the education market. However, the fit between the two companies was not good and the parent company ultimately took profits from its limited investment in Company G.

Nevertheless, during this period the LLD built up a respectable list of ABE/GED titles and became an influence in the ABE publishing community. However, the LLD never really captured the attention of the parent company and remained a small operation within Company G. In 1988, it was incorporated into the Professional Books Group and placed under the College Division. In 1989, Company G was once more sold to a large international publishing firm. This company announced plans to down-size the operation, choosing to focus on Company G's core operations. The Business and Professional Group was sold off and Company G retained only the ABE/GED titles. No new product development in this area is under consideration and the remaining titles may be put up for sale.

At roughly the same time the LLD was established, Company G also created an Electronic Publishing Division. This division concentrated on developing educational products for both the school and home markets. Market conditions were such that the company sustained a major loss with this effort, which in turn soured the company on other applications of technology. Although at one time the LLD did contemplate developing some computer software, the plans never came to fruition. Even without the negative attitude toward technology, the LLD felt that the base of technology in the ABE marketplace was too small to justify the cost of product development and would only have considered a product that had another potential market.

Company G's gradual withdrawal from the literacy marketplace was the result of a number of factors. The division was always very small in relation to the size of the overall company and not tightly integrated with its main business activity. The acquisition process eroded the original commitment of the division and its mission. By the time of the second acquisition, the division's original leadership was gone and it did not have a

strong advocate within the corporate structure. Pressured by the need to improve margins and profitability, the new parent company, supported by Company G's management, decided to concentrate on core businesses. With the College Division of Company G transferred to another operating company and the Business and Professional Group sold off, there are few perceived synergies with the existing core business, which is K-12 textbook publishing.

Company G believes that the literacy market is still highly fragmented, with each submarket having special needs. "This is a market in which individual needs and differences are much more central than they are in basal publishing, which addresses the broad commonalities of content and skill levels found in the K-12 market. We are accustomed to operating in one very clearly defined sector of the market and given our existing marketing and sales operation, would find such a fragmented market very difficult to reach." The company is also not totally convinced that the market is as lucrative as it is sometimes portrayed, at least when approached from the traditional publishing perspective.

In terms of government effort, Company G does not have strong feelings about government actions that might make the literacy market more viable for it. Given the company's history, expertise and current positioning within the larger parent organization, there is very little that would cause it to consider re-entering the literacy market. The textbook field is getting increasingly competitive and this company feels it needs to concentrate on that market. It does not believe there are enough synergies between basal publishing and the literacy marketplace, which may better suit either the ILS publishers or small supplementary publishers.

8. Company H

Company H does not consider itself a player in the literacy market, viewing literacy as outside the defined mission of the company's products designed for the K-8 market -- the company's emphasis for more than 70 years. As a result, Company H has no sales channels by which to reach any market other than the schools. By controlling its own channels of distribution, the company is able to command higher margins and is able to invest more money in product development. As one official stated, "A company can't be everywhere. It has to pick its shots and focus its efforts." There simply is no focus

within Company H on instructing adults, although the company does publish professional books aimed at teachers and administrators.

Although Company H has made no effort to create literacy products, it acknowledges that some of its products might be used in a variety of niche markets. As a company philosophy, Company H does try not to be opportunistic (i.e., promoting products in markets for which they were not designed). However, some sales representatives may sell into literacy niche markets, particularly when the literacy program is administered by a school system.

By the same token, there is very little that could induce Company H to pursue the adult literacy market. It would mean too much of a change in both product development and marketing, particularly as the company continues to focus on more complex multimedia programs that emphasis exploration and problem solving.

9. Company I

This publisher of widely used education software in the K-12 market looked at the literacy market and decided not to enter it, although the firm encourages service providers to use company products, on an ad hoc basis, in literacy programs. The company's software products have been ranked, in annual TALMIS surveys, among the top ten most widely used over most of the 1980s. It has a reputation for developing very innovative software products, particularly for the Apple II family, and enjoys considerable name recognition in schools.

Five years ago, a number of fledgling software clearinghouses for literacy programs contacted the firm to encourage them to enter the literacy market in a focused manner. One of the major hardware vendors of platforms for which the company had been developing also pleaded for the firm to develop or package products that might be bundled with the vendor's hardware. Key firm officials attended several conferences sponsored by the Adult Literacy and Technology group, among others, to learn more about the literacy market and its various niches. While one of these officials agreed that some of their products were relevant and had the potential of being effective in addressing literacy problems for adults, it had extreme difficulty in identifying how one could get these (as well as redesigned and new) products

to the various literacy providers in the several literacy market niches. After eight months of exploration, the company decided not to embark on any marketing thrust focusing on literacy. Rather, its direct marketing, primarily through catalogues and sales representatives, would take advantage of targets of opportunity based on requests from literacy providers. It would not establish any special catalogue or sales force to focus directly on the literacy market.

C. PATTERNS AND CHARACTERISTICS

In this section we summarize some of the major characteristics and patterns common among the companies (Companies A through E) that have entered the adult literacy marketplace; those on the edge, which sell some products to literacy service providers but have no literacy marketing budget (Companies F and G); and those firms which have made conscious decisions neither to develop nor to market products for adult literacy niches (Companies H and I).

1. Characteristics and Patterns of Companies which have Entered the Literacy Marketplace

Some of the most common reasons for companies deciding to enter the literacy market included the following:

- each believed literacy would increasingly become a national priority through the 1990s and most believed Federal and other funding would increase over that time frame, thus creating a market;
- each had one or more existing products which could be redesigned or built upon for literacy market niches;
- all had expertise within the firm to develop or market some products in one or more literacy niches; and
- for each of the firms, the customer base requested adult literacy versions of one or more of their products, indicating a growing market demand.

Information sources influencing these companies' decisions to enter the market included:

- all relied on market research firms and consultants to provide initial and/or ongoing information about literacy market niches; and

- all used USED Literacy Clearinghouse reports and information to some degree, as well as commercial newsletters, especially for DOL-funded programs.

Several patterns related to product development and product characteristics emerged, including:

- all firms relied mostly on in-house product development staff, and some consultants, rather than on independent, commercial software development houses;
- in four of the five firms, the product development staff had moderate to extensive experience in designing programs for at-risk youth and/or special education programs; three of the five firms had some in-house staff extremely familiar with instructional design for illiterate adults;
- all firms relied heavily on extensive alpha and beta testing of products with their existing customer bases or at new sites; and
- in designing products, most found the existing research base on low-functioning adults lacking and had to rely heavily on input from practitioners, focus groups, and consultants, particularly those active in the Adult Literacy and Technology network.

Common design features across the firms' product lines include:

- Use of computer-based diagnosis and prescription is extensive, with instruction focusing on specific skill development for individuals with wide variances in entry levels.
- Use of an instructional management/curriculum manager system which facilitates some customization to different program configurations and allows student- or teacher-directed, individualized instruction in an open entry/exit environment.
- Most programs provide literacy training in the context of the work place, building upon prior language experience.
- In more than half of the firms, the product line executes on new technology formats, including multimedia and CD-ROM; one firm develops only for a hardware base when a critical mass is achieved.
- Extensive use is made of voice and graphics in an adult learner context in four or five firms.
- Four firms provided "strands" or complete programs for limited English proficient adults.

Common patterns in the area of marketing/distribution include the following:

- In four firms, multiple channels, including VARS, co-marketing with business partners, dealers, representatives, direct sales, telemarketing, etc., are used extensively for their most appropriate market niches.

- Products are positioned for different market niches through the use of curriculum managers to customize solutions, starter lesson kits, and/or differentiated teacher guides and user manuals.

- Flexible pricing arrangements are available and used creatively by sales staff to accommodate different user/niche market needs and funding sources, particularly among ILS vendors.

Based on comments from corporate officials, a number of immediate problems are surfacing as they continue to develop and market products for adult literacy niches, including:

- All of the firms that have attempted to penetrate the corporate literacy market have found it the most challenging niche in terms of identifying the decision makers with funding and how best to reach them.

- Most also believed that the level of customization for each niche market and, particularly the degree to which work place literacy training must be customized for job clusters, is an important issue with significant pricing implications.

- Virtually all respondents believed that the population most difficult to serve effectively is older adults with minimal or no schooling who may be motivated but who have serious learning disabilities and other problems; designing products for this population is difficult because of the lack of a knowledge base and research on what approaches work best.

2. Publishers on the Literacy Market Periphery

Companies F and G are on the periphery of the literacy market. Company G is a textbook publisher who, in the past, sold adult literacy print materials; Company F is a major software publisher whose primary market is the consumer/home entertainment business. One company is not seriously considering entering the literacy market and the other had reduced its marketing thrust for text and print materials. Several similarities or patterns, however, exist, including:

- Neither firm believes that enough synergy exists between literacy and its core business (i.e., textbooks) or existing marketing and distribution channels (i.e., distributors).

- Both firms believe the opportunity cost of developing quality products will be high, drawing resources from the consumer software business or the K-12 textbook business.

- Both firms perceive the adult literacy market to be a number of difficult-to-reach niches, all with differing needs, which conflict with the volume-driven nature of the consumer software market or the general textbook market.

While the software publisher believes that more information about the literacy market will be required for it to give greater consideration to this market, the textbook publisher believes that current information has probably overstated the growth and funding for the overall adult literacy market.

3. Firms Deciding Not to Enter the Literacy Market

Two of the firms interviewed made conscious decisions not to enter the literacy market for different reasons.

Company H believes that literacy is outside its defined mission, a focus specifically on the K-8 market which it has pursued for 70 years. While some of its products are sold to literacy providers serendipitously, the company's philosophy is to promote products in the markets for which they were specifically designed.

Company I, a well-known education software publisher, spent more than a year (approximately five years ago) gathering information about the emerging adult literacy market, attending literacy conferences, and conducting market research. It concluded that the literacy market was so fragmented that it would require too many distribution channels to reach service providers. Hence, the cost of new distribution channels outweighed the potential synergy of some of its existing products, which could have been redesigned for the literacy market.

IV. ECONOMIC VIABILITY OF THE LITERACY MARKETPLACE

Throughout the prior chapter of this report, much detail has been presented on the background and structure of, and the participants in, the literacy market for software products. Below, we: (a) summarize key features of the market; (b) address the market's viability in the years to come; (c) describe the strategies used by market participants to deal with significant barriers; (d) suggest a number of market-related Federal interventions which could improve the quality and availability of technology-based products for literacy market niches; and (e) conclude with some thoughts on Federal policies which are more radical than those which rely on market mechanisms.

A. CURRENT MARKET STRUCTURE

The developers and suppliers of software used in adult literacy niches constitute only a small percentage of publishers within the education market generally; yet, as a result of increased Federal and state funding and greater market opportunities, their number has grown rapidly over the last three years. Most of these publishers are in the traditional K-12 education market; some have crossover products to the consumer/home education market. As described earlier, the demand for literacy software products has increased significantly over the last four years, as has the number of service providers in the niche areas. This sector of the education software industry is more volatile than the K-12 market and is influenced greatly by funding levels, Federal and state policies and priorities, and economic conditions. For example, during the "comment period" before finalization of this Final Report, one of the major players in the field released most of the staff in its adult literacy group, postponed the roll-out of a sophisticated new literacy product, and was then acquired by its major competitor. Another important player experienced a management restructuring which is likely to result in a redirection of the firm's literacy strategy.

In terms of professional associations, coalitions, and alliances, this market niche is less mature than such sectors as special education, which has a longer history of technology use. However, some of the characteristics of the special education market of five to ten years ago can be found in the

current structure of the adult literacy market. Below, we describe a number of factors contributing to the current, ever-evolving structure of this market niche.

1. Fragmentation

Adult literacy is the most fragmented of all education market niches. It is, in reality, a number of market subniches including: (a) correctional education; (b) community college remediation and adult basic education; (c) remediation and job preparation in JTPA/JOBS; (d) vocational and remedial education at the secondary level; (e) volunteer programs; (f) personalized, at-home literacy; and (g) corporate work place literacy. Moreover, crossover exists with other market niches such as English as a second language/bilingual programs and emerging parent-child education. This fragmentation can be partly attributed to the myriad of Federal agencies that fund adult basic education efforts and the range of traditional and new service providers, including volunteer organizations, school districts, correctional agencies, and community-based organizations. Obtaining market and related information on these disparate niches and promoting them has been a problem for most publishers.

2. Unique Program Requirements

Within each of the literacy market niches, software must meet a number of unique requirements (beyond some common strands). For example, participant-directed, self-paced programs are most appropriate for the Job Training Partnership Act (JTPA) and work place literacy programs; multimedia programs with presentation and tool capabilities are frequently more appropriate for college and volunteer programs. In some programs (e.g., JTPA/JOBS, corrections), the individual needs of participants vary considerably in terms of education entry level, English proficiency, and nature of learning and other disabilities. Firms that have been successful in these marketplaces have developed alternative configurations of their core programs and positioned them for specific market niches, learner needs, and service provider types. It is clear that the cost of product development and customization to meet these different program requirements strongly influences publishers' perceptions of the viability of the literacy market.

3. Multiple Channels

The variety of niches within the literacy market require different channels for publishers to reach service providers. Several successful firms have used a combination of exclusive and non-exclusive dealers, direct mail and telemarketing, value-added re-seller (VAR) relationships with integrated learning system (ILS) vendors, and co-marketing with publishers of complementary products. For many publishers, the use of multiple channels is time consuming, costly, and complex to manage. Many firms also provide alternative pricing arrangements to suit customer needs. For example, an ILS may be sold to a school district under an annual software license, while the same program may be provided to a JTPA service provider through a lease-purchase arrangement, with payments based on performance of participants. Adult literacy publishers/distributors who act as VARs for hardware providers, often face an additional problem: that is, major hardware vendors often distribute through a number of separate companies and/or divisions covering the range of adult literacy niches. These channels frequently have different channel pricing and distribution procedures.

4. Sensitivity of Demand to Funding and Economic Conditions

Virtually all software publishers in the literacy market have entered the market because of increased funding of literacy programs. Within the various literacy niches, however, purchasing is very sensitive to funding level changes and general economic conditions. One particularly complex market niche is the JTPA/JOBS system. On the positive side, JTPA appropriations are forward funded for three years. Therefore, at any point in time, the typical Private Industry Council (PIC) will have actually allocated about 50 percent of its current funding for program operations. Moreover, because the JTPA funding/decision-making cycle is different from that of a typical school district, "peaks and valleys" in marketing efforts can be spread over the two niches. On the other hand, JTPA funding increases in a given state for one year can be extremely misleading. For example, because one of the critical criteria for determining state JTPA allocations is the unemployment rate, a state may , during recessionary times, receive a large increase. However, because of high unemployment, the PIC and its service providers may focus on matching unemployed, literate, trained individuals to existing jobs rather than focusing on unemployed individuals who require literacy and job

preparation skill development. Within the JOBS program, even if Federal funds are available, states that cannot produce matching funds lose their Federal funding. This happened in FY91 when more than one-third of Federal JOBS funds -- almost $500 million -- went unused.[50]

Economic conditions also have a double-edged effect on the community college remediation market. The current enrollment in two-year colleges has increased significantly more than enrollment in four-year institutions; yet, this year, current state funding for community colleges has been reduced for the first time in 40 years. Similarly, although data are not available, it could logically be assumed that corporate literacy activities have suffered budget cuts as a result of the current recession.

B. VIABILITY OF PUBLISHERS/SUPPLIERS

The major types of publishers (both case study firms and others) currently involved in marketing products to the adult literacy market niches include:

- textbook publishers who have acquired or developed technology-based supplemental and other programs (e.g., Simon & Schuster recently acquired Computer Curriculum Corporation);
- traditional textbook publishers in the literacy market who have recently developed software products (e.g., Steck-Vaughn);
- publishers of education software for both home and school use (e.g., Davidson & Associates);
- traditional education software publishers who have produced or repackaged, for adult literacy niches, software products used initially in schools (e.g., Hartley Courseware, Skills Bank);
- software publishers who have developed products initially designed for specific literacy niche markets (e.g., Conover Company); and
- ILS vendors who have made significant penetration into one or more of the literacy niche markets (e.g., The Roach Organization, WICAT Systems, CCC, Wasatch Education Systems, Jostens Learning Corporation).

---

50. U. S. Senate, Report to the Committee on Finance, Welfare To Work, (Washington, DC: General Accounting Office, September 1991).

Some of the most profitable software publishers (many of whose products are purchased by literacy service providers) sell popular "edutainment" products to the consumer market. Because of the fragmented nature of the literacy market, however, the current economic recession, and other factors, the health of the industry supplying software and related products to literacy markets is not good. Software publishers who have, for the last three years, committed to the literacy marketplace for technology products are only now beginning to show small profits, although annual sales to these markets have increased between ten and 30 percent annually. The cost of sales, distribution, and support continues to erode profit margins. Moderately profitable, small to medium-sized publishers tend to be those with high-quality, low-priced products marketed through a variety of channels to niche customers; these firms manage their costs of sales prudently. Firms who are committed to the literacy market, but who have yet to experience profits, have maintained their presence, usually through acquisition, merger, and private or public offerings for capital investment.

With the exception of two or three small to medium-sized publishers and ILS vendors, very little corporate profits have been invested in the development of new products to be sold in the literacy marketplace. Rather, corporate resources are being redirected to marketing existing products and/or supporting existing customer bases.

C. MAJOR BARRIERS AND COPING BEHAVIORS

Clearly, there are a number of significant barriers for software publishers and related technology-based firms in the adult literacy market. Below, we describe some of these barriers, as confirmed in our case studies and discussions with knowledgeable experts, and the means by which firms have attempted to deal with these barriers.

1. Information Sources

Most of the case study respondents and other experts agreed that the Federal government, particularly the Department of Education, provides good information on the following:

- the nature and extent of the literacy problem in America and its implications for the economy;

- descriptions of model approaches undertaken by research groups and service providers (often in the form of case studies);

- research findings on traditional instructional approaches;

- funding allocations by major Federal programs to state and local agencies (but not to service providers); and

- assessment trends (e.g., GED results, NAEP findings).

Responding firms indicated that they had access to this information either directly or through consultants or market research firms who assisted them in planning. However, as they noted, most of the above information is targeted on practitioners and users and is less helpful to publishers and developers.

Publishers indicated that the following information and information sources could be useful in the development of marketing plans:

- *Current Use of Technology in Literacy Programs, including hardware platforms:* With the exception of school-based literacy programs, this type of information for literacy service providers is not available from traditional education mail list firms; nor is this information captured through periodic surveys by any association representing providers in existing market niches (with the exception of the Correctional Education Association).

- *Research on Program Effectiveness:* One of the major barriers identified by most of the case study firms was the limited research base on the most appropriate and effective design features, particularly for low-functioning adults and adults with limited English proficiency or learning disabilities. Most believed that research disseminated by the U. S. Department of Education's (USED's) Clearinghouse on Literacy and by vendors focusing on specific populations was limited.

- *Expenditures by Service Providers:* Data on current expenditures by service providers for literacy programs is very spotty, varying according to the literacy niche market. For example, neither the USED nor the U. S. Department of Labor (DOL) has conducted a uniform study of its programs that identifies average participant expenditures for hardware, software, and instructional materials. The only available estimates focusing on these areas are based on limited surveys conducted by specialized market research firms.

- *Program Needs:* Most of the case study respondents wanted information on the specific needs of programs within the different niche markets. In many instances, they attempted to extrapolate the needs of at-risk

youth to literacy populations, but found that such attempts were generally unsuccessful. No USED or DOL survey has identified specific program and staff needs in adult literacy niches that could be accommodated through the use of technology. Hence, most respondents indicated that they conducted their own needs assessment during product design (working with test sites) or relied on perceptions and advice of expert practitioners.

In summary, the companies in the case study adopted a variety of coping strategies to deal with the lack of appropriate information, including:

- hiring consultants and market research firms to conduct limited studies or to develop "best estimate" projections;
- conducting their own design research during prototype testing, rather than relying on existing research;
- hiring individuals with prior development/marketing experience in literacy areas who have their own limited information sources; and
- building upon existing products and refining them based on feedback from their customer base.

2. Design and Development

In addition to operating with little useful research on effective product design features for hard-to-reach illiterate populations (see above), many firms marketing technology-based products in the literacy arena have been confronted with other barriers related to product design and development:

- Standards: While most case study respondents recognized a need for different program configurations influenced by learner characteristics and operational environments, all agreed that the lack of standards and alternative assessment instruments to norm-referenced tests created a problem for program designers. They believed that, within certain programs (e.g., JTPA/JOBS), performance and other standards were being implemented differently across sites and customers. If commonly accepted standards and objectives were used, customization costs could be reduced and, over time, prices would decrease. Most believed that the acceptance of standards (such as the recommendations of the SCANS group) would be positive and, in the long term, improve the viability of the literacy marketplace.
- Experienced, Qualified Staff: The availability of experienced and qualified staff to develop literacy products is generally perceived to be a significant barrier, particularly among firms who have decided not to enter the adult literacy market. Virtually all of the case study firms who entered the marketplace had a core team with directly related experience, which they could supplement through consultants and reassignment of staff from other divisions within the company.

- Funding: Despite the high costs of developing literacy programs, particularly for new multimedia formats that allow customization, virtually all of the firms included in the case studies were able to raise the appropriate funding internally or through partnerships with other groups. None of the case study firms sought development funds from Federal agencies or state departments of education for their initial literacy product line, although some of them expressed interest in using these sources for expanding or enhancing product lines.

- Product Design and Testing: Most of the case study firms indicated problems in obtaining feedback from practitioners and test sites during product design and prototype testing phases. Two firms experienced difficulties in their test sites with low-achieving adults who attended programs only sporadically in an open entry/exit environment, creating data collection problems. Virtually all of the firms had difficulty in finding individuals within associations representing the various niches who could provide appropriate feedback; rather, they had to rely on key consultants from the Adult Literacy and Technology (ALT) Network to provide this information. Most of the firms in the case studies felt strongly that their development staffs should have greater opportunities to meet periodically to exchange information, in small conferences or forums, with knowledgeable practitioners.

3. Marketing and Distribution

Most of the major problems confronting publishers in the literacy market relate to marketing and distribution.

Due to the fragmented nature of literacy market niches, the most serious barrier is finding appropriate channels through which to reach potential customers. Such fragmentation can be attributed to the multiplicity of Federal and state literacy funding sources (with their unique requirements), the different types of providers, the relatively small size of individual programs, and the wide variation of participant needs in such programs. All of the firms in the case studies, used more than one channel to reach decision makers and purchasers. Virtually, all used some type of direct marketing, including direct mail, using, where available, service provider lists. Most used a direct sales force, particularly for key accounts, as well as a combination of dealers and sales representatives who specialize in specific market niches. Some also used value-added resellers (VARs), including ILS, hardware, and smaller companies with existing penetration in niche areas. Those who have attempted to penetrate the corporate literacy market have had great difficulty in identifying key influencers and decision makers within corporations. As a result, these firms increasingly approach intermediary

service providers (including community colleges and unions) that could serve employees of firms under tuition and other arrangements.

Another major marketing problem is the cost of positioning, differentiating, and customizing products for different niche market providers. This problem can be attributed to market fragmentation and the lack of uniformly applied standards in the various niche markets. Some firms differentiate their core product by positioning it differently for providers through teacher guides, manuals, etc.; others have developed "shells" that accompany the core products and can be customized by the firm and/or client. The niche in which the question of customization has been the greatest problem is the work place literacy market, where the context for learning activities could range from occupational clusters to specific jobs. In part, the solution to the problem relies on the customization capabilities of the product and the price the customer is willing to pay.

Another important problem is the pricing of different versions (e.g., stand-alone versus network) of core products for different service providers. Because most adult programs have small budgets, many firms have been willing to negotiate lower installation costs for "starter" versions of their products and, over time, adding products/components as funds become available.

D. FEDERAL POLICY INTERVENTION AND PROBABLE EFFECTS

In this section we describe some possible Federal policy intervention strategies, which are designed to make market mechanisms more effective, and their probable effects on the viability of the adult literacy market. The information presented here is based on interviews with case study respondents, discussions with education software industrial leaders, and the professional judgment of the TURNKEY team.

1. Increased Stable Federal Funding for Literacy Service Providers

The modest increases in Federal funding for certain literacy programs (adult basic education) over the last few years have not outweighed the effect of the recession, which has had a greater negative impact on the literacy market than on K-12 education generally. Virtually all of the case study respondents and most other software industry officials believe that increased

Federal funding, provided directly, and in a stable manner, to service providers would increase the number of entrants into the adult literacy market and possibly improve the quality of software through increased competition. Moreover, increased funding should be earmarked specifically for literacy programs and allocated directly to service providers rather than to intermediary agencies and bureaucracies, a notion reflected in the President's proposed consolidation of some literacy and vocational education programs under Private Industry Councils. Funding uncertainty -- such as occurs in state matching under the JOBS program or JTPA reallocations from literacy to job-match activities -- should be minimized.

Without this Federal funding increase, there will be few, if any, new software product development initiatives, particularly for multimedia formats. Moreover, greater industry concentration among the ILS firms will result in less competition and higher prices for English as a second language (ESL) literacy programs.

The effects of this intervention strategy can be attributed to a number of factors, including the following:

- Increasingly, education software publishers are looking upon Federal funding as "hard", rather than "soft", money, especially in light of state funding cutbacks over the last year.
- Given the reduced state funding and commensurately increased uncertainty, traditional K-12 education software publishers are seeking new markets for their products.
- Software publishers/developers increasingly see the great potential of multimedia programs in ESL/bilingual programs because of the significantly larger number of limited English proficient (LEP) participants in literacy programs. (There has been a 183 percent increase in ESL enrollment in ABE programs between 1980 and 1989.)[51]

Below we present a scenario reflecting the impact of this strategy under the assumption that Federal funding for adult basic education, work place literacy, JTPA, JOBS, bilingual family literacy, and various preschool programs supporting parent-child education (e.g., Head Start, Even Start) would increase between 25 and 35 percent annually over the next three years.

---

51. U. S. Department of Education, Teaching Adults with Limited English Skills, (Washington, DC: 1991).

We envision that the number of traditional education software publishers who will develop and make available literacy software packages would double over the next three years. Most of these publishers will be small to medium-sized firms who, heretofore, have focused on at-risk youth and Chapter 1 programs. The number of individual literacy software titles should increase by 200 to 300 percent within three years. The vast majority of these titles, however, will be adapted and/or reformatted programs, building on remedial and basic skills programs currently marketed by these firms. Only firms currently developing multimedia products for the K-12 and non-literacy markets will develop/adapt programs in a multimedia format for literacy niches.

The following additional effects on the industry structure are likely to occur. A few of the larger corporate training groups may acquire software publishers that specialize in literacy programming and may market their products to complement existing training products and services. Two or three of the major for-profit franchise groups will establish centers to provide literacy training, particularly in the general area of parent-child education, and will license software from several of the more successful literacy software publishers. At the same time, national service provider organizations will expand their services, also licensing products from successful software publishers. Most ILS vendors who had not already created separate divisions to focus upon literacy, will do so. Significantly more private funds for the development of literacy programs on multimedia platforms will become available through business partnerships with ILS firms. Hence, the quality of new software products for literacy programs will increase and greater capabilities for customization will become available at lower prices.

Several states, including those with large LEP populations (e.g., California, Florida, Texas), will establish partnerships (or expand existing ones) with software publishers and/or ILS vendors to develop multimedia-based programs focusing on adult literacy, particularly LEP populations.

2. Investment in Professional Development and Technology

Several recent policy studies suggested the need for earmarked funding for investments in teacher development and technology in major programs supporting literacy.[52][53] In the Southport report, Chisman recommended that the Federal government set aside, for investment in training and technology, a certain amount (i.e., two percent) of major Federal programs supporting literacy to be matched by states. The Federal government would appropriate new funds for its portions and states could use existing program funds for matching. Set-asides would increase to a maximum of six percent for training and technology in future years.

The "Jump Start" recommendation was designed to help local agencies and service providers invest in technology-based solutions and, only secondarily, to affect the software and hardware industry sectors. Applying the recommended percentages to FY92 Federal programs' focusing directly or indirectly on literacy training, the first year Federal appropriation of earmarked funds would be approximately $150 million.[54] If the funds were matched on an equal basis by all states and/or service providers, the total funding earmarked for such investments would be about $300 million. This recommendation also assumes that funds going to the states would flow to service providers through existing formulas, with a minimal critical mass (e.g., $10-20,000) for local providers. Small agencies and providers could form cooperatives to reach the critical mass.

The major impact, particularly on small service providers and agencies, would be to legitimatize the investment in technology and training. It would separate such investments from normal operating budgets and exempt them from audit and accounting procedures and regulations (e.g., JTPA performance standards) which often deter such investment. For larger service providers

---

52. Education TURNKEY Systems, Inc., op. cit. No. 22.

53. Forrest P. Chisman, Jump Start: The Federal Role in Adult Literacy (Southport, CT: Southport Institute for Policy Analysis, January 1989).

54. The major programs with FY92 appropriation levels would include JTPA ($3.5 billion), Even Start ($70 million), Adult Basic Education ($235 million), Perkins II ($950 million), Title III strengthening colleges ($88 million), Head Start ($2.2 billion), and JOBS ($800 million).

and agencies, this recommendation would legitimatize the use of technology specifically for literacy (as opposed to technology use in outreach, job matching, counseling, etc.). If such earmarked funds were forward funded for two years, funding uncertainty will be reduced and the additional planning time should result in more effective design, implementation, and use of the technology in training programs.

A major investment in teacher training and technology would have a significant impact on the software industry. During the first year, most ILS vendors and other software publishers already in the niche markets would offer new or expanded training for their installed base and customization of existing programs, particularly in JTPA and work place literacy environments. Service providers would be willing to pay a fee in order to improve the effectiveness of their programs. Network, ILS, and software publishers will install limited configurations (e.g., three to five work stations) in service provider sites not currently using technology extensively, expecting that they will have funds for future purchases. A limited number of new entrants into the literacy niches will develop partnerships with local JTPA service providers, community colleges, and Head Start sites to design either new literacy programs or adapt existing core programs to meet the requirements of specific providers.

During the second year, ILS firms whose demonstration configurations are selected for purchase and expansion will experience significant sales increases, as will some software publishers. Publishers of networkable software may attribute much of their sales increases to network configurations designed by certain local providers during the first year.

3. Adopt Secretary's Commission on Achieving Necessary Skills (SCANS) as National Literacy Standard

SCANS has developed five competency areas and three foundation areas which SCANS views as essential preparation for all students, workers, and individuals seeking employment. SCANS is in the process of expanding its recommendations in a final report, to be released in the spring of 1992. The preliminary SCANS competencies and foundations represent skills that could drive the design of learning modules, which would constitute the core curriculum of a literacy program. This policy intervention would call for the

adoption of the SCANS skills as a national policy standard for literacy programs.

The major problems evident in the different literacy market niches are: (a) the different definitions of literacy used; (b) different approaches to literacy; and (c) different content and program configurations used in the various niches. Our case studies confirm these problems as a major barrier that requires costly customization of materials to specific niches.

The following scenario is based on several critical assumptions about the SCANS report:

- The five competencies and three foundations, as detailed in the draft report, will remain intact with more detailed breakdowns of enabling skills.
- Proficiency assessment domains will be identified.
- The report will recommend that agencies receiving Federal funds for literacy programs must, at the least, be able to demonstrate clearly how the programs (approach and content) correlate with the SCANS skills and foundations; such a stipulation would be incorporated into major Federal programs through legislative amendments.

During the first year of implementation (which will begin a year or so after legislation is enacted), the following activities will probably be observed. Most ILS companies and some companies selling curriculum managers for networked configurations which rely on third-party software, will undertake comprehensive reviews of their offerings and will develop correlations of modules, lessons, and activities with the skills and, to some extent, assessment items. During this phase, a few small to medium-sized software publishers will design a limited number of multimedia prototype modules to teach skills for which multimedia is best suited (e.g., culture diversity, thinking skills). Such multimedia modules will be licensed by ILS and network vendors for inclusion in their bundled literacy packages. After a review of the quality and content of their existing programs, several relatively large publishers, along with a major test publisher, will form a major development consortium with one or two major hardware companies to design a multimedia-based program specifically to address the SCANS skills and foundations.

During the first year, a surprisingly large number of corporations which have great concern about an illiterate work force can be expected to develop policies supporting the SCANS recommendations and many will establish, as a precondition for funding and other partnerships with service providers, policies requiring that programs meet SCANS core requirements (in terms of coverage). In some states, corporate pressure will become the critical factor in state governments' monitoring and enforcing of the new legislation.

During the second and third years of implementation, as more and more states mandate service provider adoption of the SCANS framework, some states will develop partnerships with software and multimedia publishers to develop programs, mostly multimedia, which emphasize state issues (e.g., large limited English proficient population, specific industry focus). During this phase, business partnerships of publishers and hardware companies will begin marketing their products to service providers. The number of corporations adopting the SCANS framework as a condition for providing funds internally or to service providers (e.g., community colleges) will double.

By the end of the third year, a small number (perhaps two to four) of multimedia-based literacy programs will become commercially available and will experience substantial sales growth. Modules which focus on specific skills, foundations, and/or populations (e.g., ESL) will also experience significant growth. Customization services provided by ILS and network companies will be in high demand at significantly lower prices because programs will become easier to transport across occupations and because of increased competition.

4. Increased Federal Support for Research and Development

Under this policy intervention, a number of targeted activities would be undertaken, including:

- increased support for applied research, targeting low-level functioning, illiterate populations including LEP populations with low literacy levels in their native languages; such research would focus specifically on effective techniques and the conditions under which they work best;
- increased support for surveys and market research which can provide useful and timely information to developers and publishers, allowing them to make internal decisions about entry into the literacy arena; and

- a policy directive, from the President to all agency heads who sponsor Small Business Innovation and Research (SBIR) programs, which earmarks at least 25 percent of SBIR funds for the research, development, and demonstration of technology-based solutions for literacy training.

Below we summarize these policy interventions and describe their short-term impact on the literacy marketplace.

a. Applied Research

Virtually all of the firms included in the case studies and others with whom we discussed the literacy marketplace stated that available research on low functioning populations is of little utility to them in designing programs. As the "Jump Start" report recommended, increased funding should be allocated to applied research on the process by which adults learn basic skills, instructional techniques, assessment tools, and the use of technology. Partnerships between academic researchers and publishers' R&D staffs should be encouraged, as should research forums involving practitioners, developers, and researchers. Proactive research in operational settings should be a priority and research findings should be disseminated to developers through clearinghouses supported by the U. S. Department of Education, as well as through telecommunications, CD-ROM, and other formats used by ERIC.

Positive impacts of this strategy, occurring over a two-to-three years period, will likely be several-fold, including:

- the development of higher quality software and multimedia products based on empirical research;
- reduction in time and cost of designing new products, which could result in lower prices;
- the creation and expansion of special interest groups within various associations, focusing on research findings and the translation of research into practice; and
- the creation of partnerships involving developers, publishers, and service providers.

b. Market-Related Data

Case study respondents believed the Department of Education was effective in disseminating certain types of information about literacy problems and issues. However, they found that little information was available to assist them in their decisions about entry into the literacy marketplace or in the development of marketing strategies. Most respondents relied on limited surveys by market research groups to obtain such information. Among the types of information respondents considered insufficient were:

- per-participant expenditures for hardware, software, and other materials;
- lists of Federal grantees in literacy programs and how to contact them;
- estimates of current hardware use in the various niches; and
- funding allocations to providers and their purchasing cycles.

The most likely impact of increased market research would be a number of new entrants into the adult literacy market, particularly firms who target the installed platform base and who normally operate on large volumes and low prices. New entrants might also include firms who already have access to channels that reach such niches as corporate literacy and home-based literacy (e.g., via cable) activities. These new market entries will only occur after the economy turns around and literacy markets once again begin to expand.

c. Small Business Innovation Research Literacy Earmarks

This intervention would earmark at least 25 percent of all SBIR contracts for the development of technology-based solutions related to literacy training. This approach would affect the Departments of Education, Health and Human Services, Labor, and Energy, and such agencies as the National Science Foundation (NSF) and the National Aeronautics and Space Administration. Of the approximately $500 million allocated to SBIR in FY91, only one development contract was awarded for a literacy product. In the January 1992 Department of Education, Department of Health and Human Services, and NSF solicitations, only three of approximately 60 topical areas focused on literacy. If 25 percent were so allocated, the total funding level would increase to approximately $125 million.

One of the major advantages of the SBIR program is the great flexibility it affords developers, a critical factor if developers are to take advantage of technology advances. Another important advantage of the SBIR program is that the developer owns all rights for commercialization of the resulting product, providing a strong incentive for innovative development.

The net effect of this policy, which should not require new legislation, would include the following:

- a significant increase, within 18 months, of development activities on the part of software publishers and development houses;
- the development of products in a variety of formats, ranging from computers to optical media to cable/telecommunications, as a result of funding from a variety of non-traditional education-related agencies; and
- the rapid development of a knowledge base through Phase I feasibility studies and prototype testing in Phases I and II.

A large number of marketing firms with existing channels to literacy niches are likely to team up with Phase II awardees, thus increasing marketing and distribution effectiveness for the resulting products.

E. FEDERAL POLICIES FOR GOVERNMENT ASSUMPTION OF ROLES

The degree to which the proposed interventions will result in products whose quality and effectiveness will be significantly improved cannot be guaranteed; nor will they necessarily result in a diversity of products and vendors necessary for healthy competition. Adult literacy is a limited market with attendant problems of fragmentation, risk, and uncertainty facing both developers and publishers. In similar, limited-market situations (e.g., special education), the Federal government has assumed a greater role -- as well as many of the risks and uncertainties of the private sector -- in order to encourage technology development and marketing. Below, we briefly describe some additional Federal policies which assume a more active government role in the literacy arena.

As we reported to OTA in a supporting document for Power On! (TURNKEY, September 1987), ED/OSEP has, over the last two decades, undertaken several successful initiatives to encourage new product development and marketing to

increase the availability and quality of programs for students with disabilities. For example, in the 1970s, it guaranteed a limited market for such products as Opticon and the Kurzweil Reader by agreeing to purchase a specific amount of such products when delivered according to specification. Subsequently, it developed the Market Linkage Project for Special Education which provided technical and marketing assistance to firms planning to enter this marketplace. ED/OSEP continues today to provide significant Federal research and development support for product development under the Technology Media and Materials Program and the SBIR Program. As we reported in 1987, this program is considered to be exemplary Federal R&D support for education technology programs.

While there are similarities between special education and literacy, several major differences also exist. Numerous provisions of P.L. 94-142 (Education for Handicapped Act), passed in 1976, generated a demand for products which could be used to meet the Free and Appropriate Public Education (FAPE) mandates of that Law. Moreover, parallel state laws provided significant increases in state funds to districts, further enhancing such markets. Although the special education community a decade or so ago was as fragmented as the literacy market is today, organized lobbying by the various factions created a unified influence which resulted in a continuing increase in Federal funding. Without similar mandates, funding allocations, and organized lobbying efforts at both national and state levels, interventions in the literacy arena are unlikely to result in the kind of positive effects which have occurred in special education.

Some advocates of technology use in literacy programs have suggested the need for a massive research and development effort for literacy equivalents to that of the National Science Foundation for science and math (Antonio Stone, 1992). While most of the firms included in the case study felt other initiatives offered greater potential, it is conceivable that such an R&D effort could result in new entrants into the adult literacy marketplace; most of these are likely to be partnerships between universities and private developers. Such an initiative could bring about new, high-quality prototype products which would take advantage of emerging multimedia and telecommunications developments. Even if appropriate funding levels were made available and multidisciplinary teams would develop new designs and prototype products,

this initiative would not address the marketing and distribution problems currently confronting commercial and other groups in the marketplace.